cross sections

Magazine for the Structural Engineers Association of New York

2017 VOLUME 22 NO. 1

THE CONCRETE ISSUE

cross sections

2017 VOLUME 22 NO. 1

SEAoNY
536 LaGuardia Place
New York, NY 10012

www.seaony.org

publications@seaony.org

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On the Cover
Post-Tensioned concrete slab construction at the Roy and Diana Vagelos Education Center at Columbia University Medical Center.
Photo by Matt Melrose, LERA

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President's Message

SEAoNY is expanding upstate! On March 30, SEAoNY had its first official event with the IBC Code Changes Half Day Seminar held at the Milton J. Rubenstein Museum of Science and Technology in downtown Syracuse. Presented in conjunction with the Northeast Coalition of Structural Engineers (NECSEA), it was a big success with over 20 participants. As one of the seminar presenters, I saw and heard firsthand the interest and enthusiasm of structural engineers in the Syracuse area as we discussed the plan to start a chapter there.

When SEAoNY was originally established under the National Council of Structural Engineering Associations (NCSEA), the intent was that we would represent and serve the entire New York State region and not just New York City. With the initial volunteer base being in NYC, SEAoNY focused on that area. However, things have changed. At the last NCSEA Summit, members of our Board met an enthusiastic SEAoNY member in Syracuse interested in activity local to that area. Excited, the Board created an ad hoc upstate committee to work with volunteers in the Syracuse region to put together this first event. The next Syracuse event is scheduled for June 27th focusing on cross laminated timber and Syracuse members are planning more activities and working with the upstate committee to create an organization for a Syracuse chapter.

A membership structure appropriate for members throughout New York State has been established. The goal is that the upstate regions will continue to organize and develop programming to serve their local needs while staying connected with SEAoNY members throughout the state. The use of video talks and virtual meetings is being used to allow members to communicate over larger distances. Stay tune for future developments! SEAoNY is here for all of New York so if you are reading this and would like SEAoNY to do more for you, please contact us.

Doug

Editor's Message

Dear Friends and Readers,

In this issue, we bring you features highlighting a material close to our hearts, concrete. We will hear the words from a titan of the concrete industry in Bill Phelan. We will provide some practical tips for dealing with field issues related to concrete construction. Additionally, Michael Hopper has written a fantastic piece about the potential for utilizing post-tensioned concrete in New York and the challenges a designer may face in doing so.
We hope you enjoy!

The Publications Committee is hard at work on our next themed issue for this year, Technology in the AEC industry. If you are at the forefront of utilizing a new technology in your practice, or just interested in a particular topic, please reach out to us at publications@seaony.org.

Adam J. Kirk, PE

UPCOMING EVENTS

May 11, 2017
6:00 PM
Center for Architecture
536 LaGuardia Place

SEA•NY YMG & ASCE YMF PRESENT: PERKS AND PITFALLS: A DISCUSSION OF BIM & ANALYSIS SOFTWARES

June 12, 2017
10:00 AM
Mahopac Golf Club

12TH ANNUAL SEA•NY EDUCATION FOUNDATION GOLF OUTING

June 21, 2017
6:15 PM
Center for Architecture
536 LaGuardia Place

SAVE THE DATE - THE SE3 PROJECT: STRUCTURAL ENGINEERING, ENGAGEMENT, AND EQUALITY

Visit www.seaony.org/programs for additional information on these and other events!

SEAoNY COMMITTEE UPDATES

Education and University Outreach Committee:

The Education and University Outreach Committee had a busy first half of the year initiating the new Young Member's (YM) Group and working to improve our already robust student programs. We've hosted a new YM Trivia Night and YM Holiday Party in addition to our annual Structure Quest event. As we look to the next half of the year, we have four more programs on the agenda. We will be hosting our annual Resume and Interview Workshops and Shadow a Structural Engineer program as well as a newly created YM General Body Meeting and YM Engineering Panel presentation with ASCE. It goes without saying that the success of these programs is only possible with strong participation in the form of volunteers and event attendees. To that end, the committee has been committed to broadening our outreach. We have been and are still actively working to expand to new universities, encourage new professionals to volunteer and attract new young members to participate in our events. If you are a professional or young member and would like to learn more about how you can participate, please feel free to reach out to our committee at seaonyeducation@gmail.com.

Education Fund Committee:

The SEAoNY Education Fund committee is prepping for the beginning of the signature event planning, the SEAoNY Education Fund Golf outing. This year's event will be held on June 12th, once again at Mahopac Golf and Beach Club. Planning will kick off in early March with the formation of and first meeting of the planning committee. We look forward to yet another successful event.

Membership Committee:

The Membership Committee has been busy this year working on a number of initiatives aimed at increasing and retaining SEAoNY membership. First, we have been working to compile a list of SEAoNY benefits to have displayed more prominently on the website. Second, we have been researching the feasibility of providing a SEAoNY-branded 'Welcome Gift' for new members in future years, with the goal of having something to implement this September at the start of SEAoNY's next fiscal calendar. Finally, we have once again been organizing the President's Breakfast Roundtable, which is designed to be an event unique from those organized by the Programs Committee in the hope that it will increase and retain membership by appealing to a different cross-section of our profession. This year's Roundtable topic will be a 'State of the Industry' discussion about some of the issues we are facing as a profession, and how we can address them both as engineers and as firms. Our initiatives and efforts in this and in previous years appear to be paying off, as we are pleased to report that SEAoNY has 443 members as of the end of January 2017. This surpasses the January membership total for any year in recent memory, and if previous years are any indication, we seem well on our way of breaking our goal of 500 members by the end of August."

Programs Committee:

The Programs Committee has seen a respectable retention of existing members as well as an influx of new members. It is with the combined efforts of our members that we've been able to kick off the year with the Annual Meeting in September. The Annual Meeting was followed by our monthly October and November lectures titled Global Trends in Earthquakes (Ramon Gilsanz) and Get Fired Up - What Structural Engineers Should Know About Fire Design (Maria Garlock) respectively. The 2015 IBC Code Changes half day seminar, done in collaboration with the Northeast Coalition of Structural Engineers Associations (NECSEA), replaced our December evening lecture. Our programs in 2017 will see monthly lectures focusing on topics such as forensic engineering (January), threaded bar reinforcement (February), structural classification of buildings (March), concrete design and construction (April) as well as cast steel connections (May). Our featured seminar, the SEAoNY All Day Seminar, will focus on construction administration, means and methods and will held in February. We will begin accepting entries for the Excellence in Structural Engineering Awards, which recognizes achievements by New York Structural Engineering Firms, in February. The winners will be announced on our Annual Boat Cruise to be held in June. The Programs Committee continues to meet on the last Wednesday of each month unless otherwise noted.

SE Licensure Committee:

In December, the SEAoNY board approved recommendations for SE Licensing requirements and SE License Project Threshold criteria. The SE Licensing Requirements include relevant experience, passing the SE Exam, and grandfathering provisions. The SE License Project Threshold includes Structural Occupancy Category III and IV buildings, buildings over 60 feet tall, in Seismic Design Category D, with spans more than 150 feet, and with more than 1000 total occupants. More detail on these recommendations will be posted on the SEAoNY web site in the near future. The SE Licensure Committee is now developing marketing materials and staring marketing campaigns focused on engineers, other building professionals, owners, organizations, and government officials.

SEAoNY Committees • Education and University Outreach • Education Fund • Programs • Membership • SE Licensure

HOW TO HANDLE LOW CONCRETE BREAKS

By Ian Pendleton, Silman

A standard process in our engineering work is the review of concrete test results during construction administration. Of primary concern is concrete strength: Did the concrete reach its specified strength at 7-, 14- and 28-day strength (or possibly 56 days as we'll discuss further)? Other important things to look for are the slump, wet/dry unit weight (especially for lightweight concrete), air content, admixtures and dates/times of the test results.

STRENGTH

The first set of results for a given concrete placement will be the 7-day rest results. Deficiencies in 7-day strengths should be reported to the project architect and relayed to ownership, especially for flat-plate concrete framed slabs which tend to proceed fairly quickly with the forming and placement of successive floors. Unless the 7-day results are extremely low, it is rare to immediately recommend further investigation or to re-evaluate the structural design based on 7-day results alone. Generally, the approach will be to wait for the 28-day results after alerting the team to track the issue.

So let's say that the 28-day strength results do not realize the specified strength. Very often, though we as engineers would not actively promote this, a slight reduction in tested strength at 28 days does not necessarily mean 'failure'. Factors of safety are built into the code, and often there is some redundancy within a specific project design that can accept the marginal shortage. When this happens, try to find out if there's a specific location of the concrete pour subject to the deficiency or if there are any reasons to question the sampling procedures. Sometimes the last truck or sequence of a large pour will be the culprit. Other times the sampling is rushed or otherwise mishandled, = distorting the results. Also, particularly for concrete mix designs with high fly ash or slag substitution, encourage the testing agency to take extra cylinders for 56-day breaks, as the fly ash and slag (cement substitutes) tend to retard the early strength development. It was our experience on some projects that low breaks at 28 days often realized the full design strength in 56-day cylinder tests.

In the event that low strength results remain after 56-day testing (or after 28 days if 56-day results could not be obtained if there were no extra cylinders), the first step before requesting additional field investigation is to evaluate the real effect on the structural design. Again, try to find out from the inspector and contractor if the deficiencies can be isolated to specific locations in the as-built concrete. Then check the structural design of the concrete elements affected by the low breaks with the as-built concrete strength. The goal here is to avoid wasting valuable resources on further field investigation if the low-strength concrete does not compromise the design. There might be a range of low break results under consideration, so the decision must be made whether to use the lowest strength result or possible an average of a group of low strength results on a project-by-project basis. If the structural design can accept the strength deficiency, then the acceptance is reported to the project architect and special inspector so that the Non-Conformance Report (NCR) attached to the low break results can be closed out.

If the structural design cannot accept the strength deficiency, then additional field investigation and/or structural reinforcement may be required. Additional field investigation can consist of Windsor probes of the as-built assembly and core samples of the deficient concrete for additional strength testing. Windsor probe results can vary too much to stand alone, therefore they should always be accompanied by the core samples/testing. Furthermore, the scope of field investigation should be carefully considered. The number and locations of probes and cores should suit the scale of the project and the order of magnitude of the deficiency, and recommendations should be discussed with the project manager and the principal in charge before they are issued. An extensive field investigation of probes and cores may not be a good use of time and resources if the need for structural reinforcement is obvious. On the other hand, highly varied strength results may raise the question of the accuracy of the test results and/or the ubiquity of the deficient concrete in the as-built assembly, and this itself may drive the decision to recommend additional field testing. In editions prior to 2014, ACI 318 5.6.5.2 specifies that "3 cores shall be taken for each strength test more than 500 psi below the specified value of f'c," while ACI 318-14

revises this to say that "3 cores shall be taken for each strength test that falls below f'c by more than the limit allowed for acceptance," leaving this up to the building official or design professional to evaluate. (Note that a "strength test" is the average of several cylinder breaks.) Refer to ACI 318 for determining acceptability of core test results.

The sequence of these various responses to deficient concrete test results -- additional field investigation, original design re-evaluation and/or reinforcement design – may vary from project to project. The information is presented above according to one common chronology – low breaks > re-evaluation > additional field investigation > reinforcement if necessary – but specific project conditions or owners' needs may require reinforcement design ahead of field investigation, as just one example. Coordinating our response to deficient concrete rest results will usually include discussions about the cost and schedule impacts of all options under consideration. These concerns are especially time-sensitive with construction underway, therefore clear and proactive communication is important throughout the process.

WET DRY UNIT WEIGHT

This issue comes up frequently with lightweight concrete. The testing agency determines the density of the concrete at time of placement, and very often the unit weight of the wet lightweight concrete exceeds the allowable. Concerns are raised when the report is issued about the extra weight effect on the frame, for example, composite beam deflections. It is simple enough to check for the extra weight, and if there remains a concern, the engineer can request that the testing agency determine the dry unit weight of the lightweight concrete. They can usually test samples from the broken cylinders. We had success with this follow-on approach in several projects.

MIX DESIGN

The strength deficiency and lightweight concrete unit weight items mentioned above are the most common 'problems' arising from concrete test results, so they get a lot of attention. It is important to check the concrete test reports that the as-placed concrete generally complies with the approved mix design in all respects: w/c ratio, aggregate proportions, slump, admixtures, etc.

Photo: Matt Melrose

POST-TENSIONED CONCRETE IN NYC

By Michael Hopper,
Leslie E. Robertson Associates

WHAT EVERY ENGINEER NEEDS TO KNOW ABOUT DESIGNING AND BUILDING POST-TENSIONED CONCRETE STRUCTURES IN NEW YORK CITY

Post-tensioned (PT) concrete is commonly used in building structures located in traditional concrete markets, as well as in cities with strict building height limitations. New York City does not have overly restrictive building height zoning limits and its skyline mostly lacks PT concrete structures, barring a few exceptions. However, the challenges of open-plan architectural concepts and new geometric forms are leading some structural engineers to the use of post-tensioned concrete in high-performance structures in NYC. This article will address what structural engineers need to know about designing and building PT structures in NYC, including the major benefits of PT concrete, the design challenges (that the building code won't tell you about), and some unique construction challenges of PT projects in NYC.

BENEFITS OF POST-TENSIONED CONCRETE

There are two fundamental benefits of using post-tensioned concrete: 1) the tensile stresses in the concrete are limited, and thus cracking is reduced or eliminated; and 2) the high-strength steel and concrete that are necessary for stressing also increase the member capacity, resulting in a reduced amount of required conventional reinforcement. These benefits directly result in shallower structural members than conventional reinforced concrete systems, leading to additional material and cost savings in the columns, walls, and foundations.

Post-tensioned concrete also allows for long spans that are more economical than conventional concrete, which gives architects and building owners more program flexibility. Designers can control and limit tensile stresses to ensure that concrete sections remain uncracked, resulting in less deflection and more predictable performance over the life of the structure.

Other benefits of PT construction include potential schedule savings by reducing the required reshoring times, reduced long-term creep deflections via tuned load balancing, and enhanced durability (especially in structures exposed to environmental conditions).

DESIGN CHALLENGES

There are several common design challenges structural engineers face when designing post-tensioned concrete structures. Without covering the basic requirements of the building code, here are a few topics that are often overlooked in design that can create potential problems for project delivery teams.

HIGH "PRE-COMPRESSION" AND RESTRAINT CRACKING

Average effective prestress is often referred to as "pre-compression" in the PT community and is calculated by dividing a member's effective prestressing force (after all losses) by its cross-sectional area. The minimum pre-compression for slab systems required by the code is 125 psi, which is based on punching shear testing of lightly reinforced slabs. There is no code prescribed maximum limit for pre-compression, which gives engineers flexibility when designing PT concrete. However, high values of pre-compression can induce excessive shortening due to elastic deformation and creep effects that can cause significant restraint cracking in the PT member or in its supports. These potential problems require designers to ask "What maximum pre-compression limits should be considered and what precautions should be taken if these limits are exceeded?"

ACI 423.3R – Recommendations for Concrete Members Prestressed with Unbonded Tendons has historically stated that slabs with a maximum average prestress of 500 psi is appropriate for solid slabs where excessive shortening will not cause problems. In 2005, this language was strengthened, and now cautions against using slabs with an average prestress higher than 300 psi. Furthermore, it states that every means available should be employed to mitigate the effects of cracking due to the restraint of shortening. Other references, such as from the Post-Tensioning Institute (PTI), suggest using slabs with a maximum pre-compression value between 250 – 300 psi, as such designs are often economical.

What about beams? At this time, the author is not aware of any design guides or documents that provide recommended upper-bound limits for pre-compression in beams. Beams have higher stress concentrations than slabs, so it is generally expected that beams have higher pre-compression than slabs.

Recommendations:

For slabs with a pre-compression value higher than 300 psi, designers should study the impacts of shortening and restraint cracking. This can be studied with a finite element analysis by inputting the average prestressing forces and evaluating the resulting stresses in the slabs and walls. If the resulting stresses are excessive and are determined to be detrimental to the structure, engineers can introduce relief details, such as closure strips or movement joints at walls, to reduce the effects from restraint. Closure strips can also provide stressing access for congested projects (as discusses in the Limited Access for Stressing Operations section).

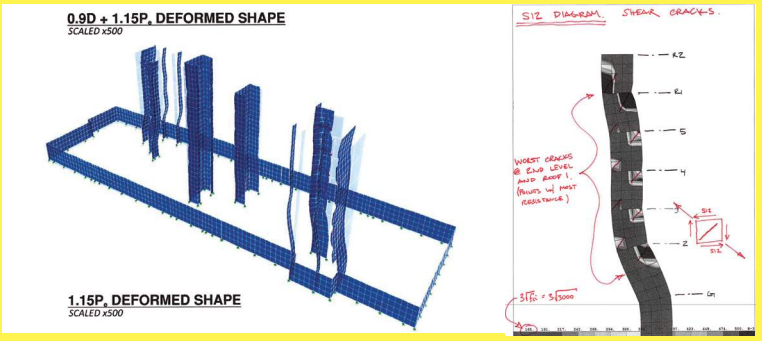


FIGURE 1 – STUDY OF RESTRAINT EFFECTS: SHEAR WALL DEFORMATION AND STRESS OUTPUT DUE TO ELASTIC AND LONG-TERM SLAB SHORTENING FROM POST-TENSIONING

LONG SPANS

Asarchitects and engineers continue to design open spaces and long spans, the need to effectively communicate and coordinate the expected structural deflections with the other building systems (e.g. the exterior enclosure, moveable partitions, or any equipment that is impacted by motion) becomes even more important. Since the design of long-span PT slabs is most often governed by the long-term deflection requirements, it is essential that structural engineers establish the appropriate design criteria with the project team as early as possible. At locations with strict deflection allowances, such as at facade attachment locations, engineers should clearly communicate the anticipated structural movements.

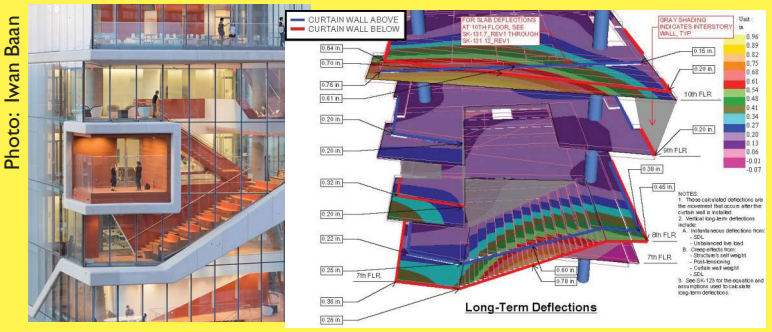


FIGURE 2 – COORDINATION OF EXPECTED STRUCTURAL MOVEMENTS WITH FAÇADE SYSTEM AT LONG CANTILEVERS

MEP SLEEVE AND CONDUIT COORDINATION

In projects with large amounts of post-tensioned construction, the tendons can put limits on the locations and spacing of MEP sleeves and conduit. Coring through post-tensioned concrete should only ever be a last-resort option (with the proper due diligence procedures to avoid cutting or damaging the PT). Therefore, it is vital for the design and construction team to coordinate acceptable zones for MEP sleeves and conduit early in the design process. It is important for the structural drawings to include areas that are designated for sleeves and therefore off-limits to PT tendons. This information should also be shared with the post-tensioning supplier for inclusion in the tendon layout shop drawings to avoid any confusion or conflicts during tendon and MEP sleeve installation.

SPECIAL DETAILING AT CONGESTED AREAS

Although the use of post-tensioning reduces the required amount of conventional reinforcement, there are still a few common areas that can become congested in PT concrete. Additional details at these congested

areas not only help the concrete contractor avoid errors, but they also ensure that the tendons are installed as straight as possible. If the tendons are kinked during installation – for instance, to avoid partially cast-in rebar – it is likely that there will be variations in the tendon elongation report used by the PT supplier to verify that the required effective forces have been achieved. If the required effective forces have not been achieved the structural engineer will need to evaluate the as-built condition and determine if corrective measures are required.

- Beam-column joints: Passing tendons between the cast-in vertical column bars and inside of the beam stirrups can be challenging if not adequately detailed.

- Slab-column joints with shear reinforcement: Installing PT tendons between and over stud rails at columns is difficult when specific details are not provided. If possible, engineers should consider increasing the space between studs when using post-tensioning with studrails.

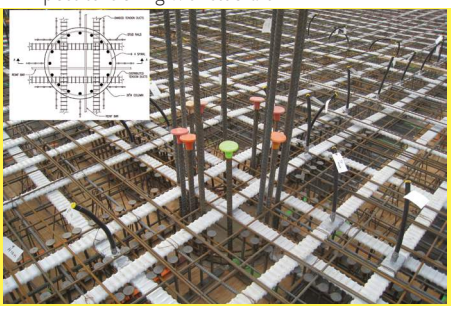


FIGURE 3 – DETAIL OF BONDED POST-TENSIONING TENDONS THROUGH COLUMN CAGE WITH STUDRAILS

Photo: Michael Hopper

- Slab edges: Most projects have several embeds at the edge of slabs. In PT projects the slab edges are even more congested because this is often where the PT anchors are located. Consequently, the design and construction team should coordinate the slab edge embeds, such as facade embeds, with the PT supplier. Furthermore, if there are spandrel beams or edge columns, the PT anchor position will need to be coordinated with the beam's stirrup spacing and/or the column's vertical rebar.

- Post-tensioning anchor rebar: There are two types of rebar required at post tensioned anchors:
  1. Local zone reinforcement – this is confinement reinforcement provided by the PT supplier to ensure that the anchor is capable of delivering a large compressive force to the concrete. For larger multi-strand anchors, this reinforcement consists of a spiral around the anchor. For smaller mono-strand anchors, a pair of #5 bars running parallel to the slab edge is commonly used.
  2. General zone reinforcement - provided by the structural engineer to resist the bursting stresses as the compressive force from the PT anchor distributes to the surrounding concrete member. Bursting forces require vertical legs of rebar just outside of the anchor's bearing plates.

  The rebar required at PT anchors can take up significant space. It's important for engineers to provide details showing the arrangement of this rebar and how it relates to other embedded items in order to avoid confusion and delays in the field. For example, at PT anchors installed next to façade embeds at slab edges, the structural drawings should provide minimum clear distances between the PT anchor rebar and the façade embed to minimize field conflicts.

Detailing these congested areas in PT projects helps to ensure a smooth tendon installation and gives the stressing operation the best opportunity to achieve the required effective forces.

CONSTRUCTION CHALLENGES IN NYC

Building any structure in New York City comes with a unique set of challenges for each structural system. A few of the construction challenges common to PT projects in NYC include:

LIMITED ACCESS FOR STRESSING OPERATIONS

Most NYC projects (and many urban projects in general) are constructed next to existing buildings. For post-tensioned construction, neighboring buildings limit access to the tendons for stressing. The structural drawings therefore, should indicate the applicable site constraints and identify areas that block access to the stressing anchors. Engineers should intentionally show live (stressing) and dead (embedded) anchors at the ends of each tendon type in the drawings. If stressing cannot occur at the slab edge, due to either site constraints or congestion, engineers should consider placing the live anchors at shaft openings where possible. If the shaft openings are not an option, then stressing pockets or closure strips could be provided, from which the tendons can be stressed. However, engineers should use caution at closure strips - if the structure is not designed to cantilever for the temporary condition, the contractor will need to provide reshoring until the closure strip concrete is cast and reaches sufficient strength. PTI suggests that the drawings or specifications include notes to the contractor clearly communicating that unique reshoring conditions may be required. Also, if a contractor is requesting to add a closure strip, their proposal should include a reshoring plan for review by the design team.

LIMITED SITE SPACE FOR TENDON FABRICATION/ASSEMBLY

NYC projects offer limited space for assembling and staging tendons. Therefore, it is common for concrete contractors to prefabricate tendons offsite. As a result, any errors in fabrication could go unnoticed until they are inspected onsite, which can lead to delays. If this is a potential concern on a project, it is recommended that the special inspector visit the tendon fabrication operations, similar to the shop inspection of structural steel during fabrication. This applies to bonded multi-strand tendon systems in particular, but can also apply to unbonded mono-strand tendon systems in unique circumstances.

LACK OF PT EXPERIENCE

One concern with post-tensioned concrete in the NYC area is the lack of substantial post tensioning experience of the concrete industry relative to other structural systems. This concern has been true historically, but today it is largely a problem of perception. PTI has made great strides in educating contractors and special inspectors through PTI personnel certification courses for tendon installation and stressing operations. Structural engineers should specify that the field personnel installing and stressing the post-tensioning system hold certifications from PTI. As with any new system, there is a learning curve with post-tensioned concrete projects in the NYC area. However, the portfolio of impressive post-tensioned work done by local concrete contractors is substantial and continues to grow.

CONCLUSION

The performance benefits of post-tensioned construction are leading some structural engineers to use PT concrete in lieu of more conventional construction methods in New York City. PT concrete allows for shallower structural members and longer spans, and can also yield material and cost savings. The specific risks associated with PT concrete structures can be mitigated through a collaborative project delivery process, comprehensive structural detailing and systems coordination, and experienced and educated field personnel. As concrete materials and technologies advance, the advantages of post-tensioning will enable builders to continue to stretch the possibilities of concrete construction.

2017 SEAoNY
HONORARY MEMBER PRESENTATION

WILLIAM (BILL) S. PHELAN,

SENIOR VICE PRESIDENT OF MARKETING AND TECHNICAL SERVICE
FOR THE EUCLID CHEMICAL CO.

On Tuesday September 27th, William (Bill) S. Phelan, Senior Vice President of Marketing and Technical Service for The Euclid Chemical Co. provided a presentation for the attendees of the SEAoNY annual meeting. Bill, kicked off his presentation with the statement "We work closely with Architects, Engineers, and Concrete Producers nationwide and the goal is to have our team provide high performance concrete that meets or exceeds the requirements of today and tomorrow". Words Bill lives by in his over 50 years in the concrete material industry.
Bill then proceeded to review the following criteria to illustrate how to attain the goals of the project team.

High Performance Concrete Requirements

1. Shrinkage:	**< 0.04% or < 0.02% @ 28 days.**
2. Water Content:	**Negative water slumps for formed members.**
3. Air Content:	**Yes for freeze thaw conditions. No for high strength concrete and troweled normal weight slabs.**
4. Self-Consolidating Concrete:	**Architectural concrete and all reinforced formed members.**
5. Macro Synthetic Fibers:	**All non-reinforced slabs-on-grade, toppings and slabs-metal deck.**
6- Pre-Concrete Conference:	**Detailed agenda, accurate minutes, contractor statement that the proposed mix design will enable the contractor to achieve the specified requirements. All key players must attend.**
7- Test Placement:	**Mandatory! Successful test placement is required**
8- HRWR Redosage Chart:	**Supplied by the Concrete Producer.**
9- Test Reports:	**Reports supplied to the concrete team promptly, Including Owner, Architect, Engineer, Construction Manager, Concrete Contractor, Concrete Producer.**
10- Monthly Charts:	**W/CM, Compressive Strengths, Slump or Spread, Unit Weight.**

Bill then highlighted several New York City projects that used various parts of the High Performance Concrete Requirements. The projects are as follows

1. **Columbia University Medical Center – contained Self Consolidating Concrete for their use in exposed sloping columns and voided slab technology for the first time in NYC.**
2. **VIA – 57 - contained shrinkage reducing admixture for very low shrinkage concrete on several levels of floor**
3. **Current Projects in construction**
   - **a. 220 Central Park Ave**
   - **b. Nordstrom Tower - 217 W57th St**
   - **c. 111 West 57th St**

Then after displaying a multitude of pictures on 10 Hudson Yards, Bill highlighted the mix designs used for this award winning project which is the first completed structure in the Hudson Yards complex. Bill also stated Self-Consolidating Concrete (SCC) is specified and used today for all architectural concrete and reinforced formed members.

Bill described how **Vibration White Finger or VWF** (also known as **hand-arm vibration syndrome and dead finger**) is a secondary form of Raynaud's disease, an industrial injury triggered by continuous use of vibrating hand-held machinery. Use of the term Vibration White Finger has generally been superseded by **Hand-Arm Vibration Syndrome (HAVS)**. The symptoms of Vibration White Finger are the vascular component of Hand Arm Vibration Syndrome. HAVS is a widespread recognized industrial disease affecting tens of thousands of workers. It is a disorder which affects the blood vessels, nerves, muscles and joints of the hand wrist and arm. It's best known effect is vibration-induced white finger (VWF).

Then Bill highlighted **Eli & Edythe Art Museum** "The Art of Concrete" at Michigan State University. This remarkable project demonstrated the effects of exposed, high performance concrete can be achieved with the use of Self Consolidating Concrete. Bill detailed that the architect expected and received no blemishes on the exposed surface, thus displaying an impeccable finished appearance for a vertical structure. Bill went on to describe in detail the concrete mix design that was used to accomplish it.

WILLIAM (BILL) S. PHELAN,
SENIOR VICE PRESIDENT
OF MARKETING AND
TECHNICAL SERVICE
FOR THE EUCLID CHEMICAL CO.
speaking at the
presentation for the attendees
of the SEAoNY
annual meeting

Bill concluded his presentation using a contractor's view of why the value of Self Consolidating Concrete is an important feature in the contractor tool shed.

Some of the values are as follows:

- **Architectural Finish**
- **Congested Reinforcement**
- **Complex Formwork**
- **Increased Production**
- **Cost Savings**
- **Safety (Ergonomics / White Finger)**

After each bullet point, Bill illustrated each value with a corresponding photo.

The audience of seventy thanked Bill for his time and efforts over the years in promoting of quality concrete topics.

Bill William J. Lyons III, FACI
Northeast Region
National Business Development Manager
The Euclid Chemical Company
cell (201)-401-3391
www.euclidchemical.com

2017 SEAoNY Education Fund Golf Outing

Support a great cause while improving your handicap, getting some sun, and mingling with colleagues! Join us Monday, June 12th for a day on the links in support of the SEAoNY Education Foundation.

Proceeds from the golf outing provide scholarships for students who are chosen by that year's Honorary SEAoNY Member. This past year, scholarships were awarded to Jonathan Rodriguez and Christopher Sholy, who are both students at Rutgers University.

In addition, each year the Education Foundation provides a scholarship to a high school senior from the Urban Assembly School for Design and Construction to support them as they go on to represent our industry and become leaders in promoting our profession. Last year's scholarship winner was Nicole Henriquez who is now attending the University of Buffalo.

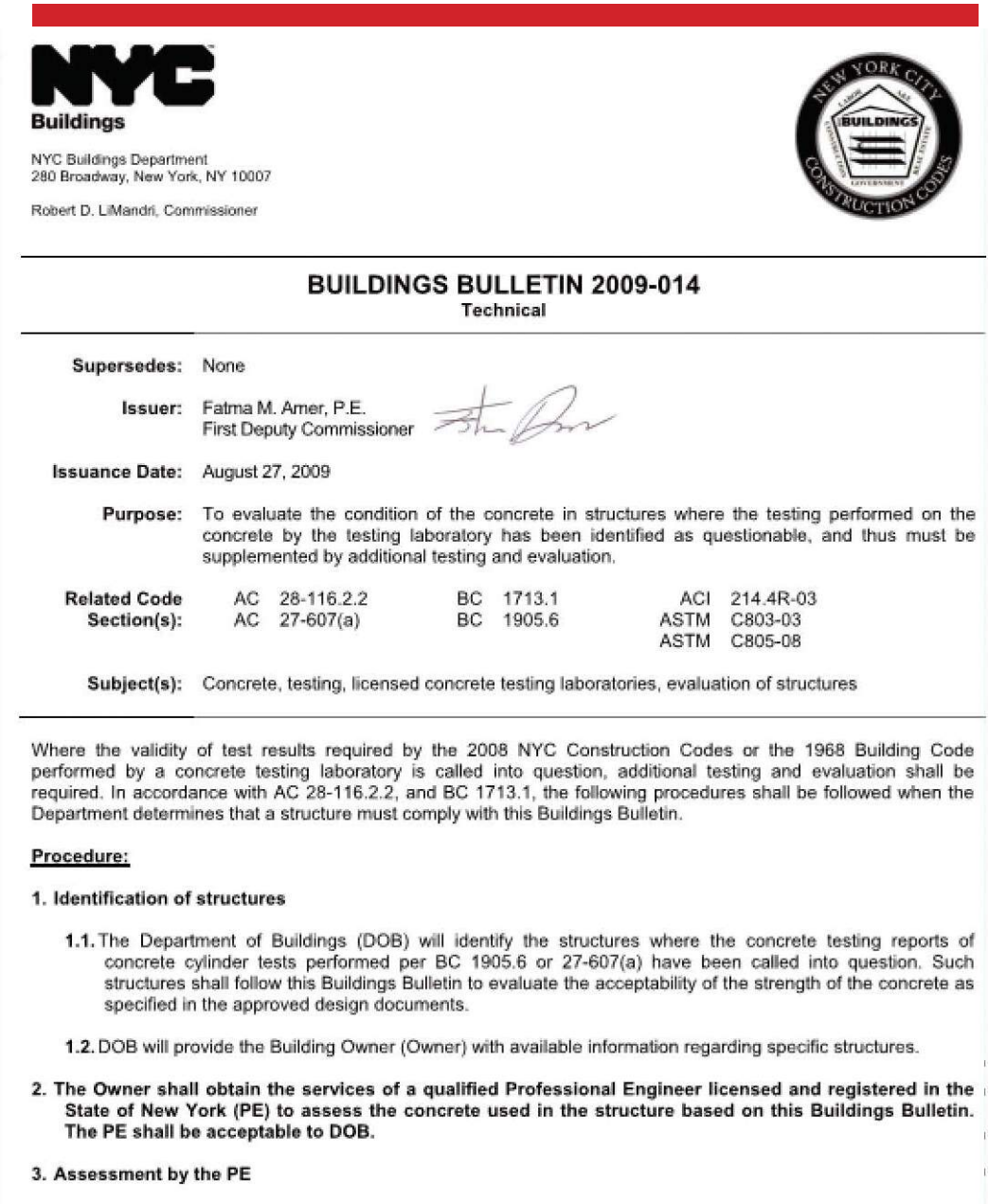
RSVP BY MAY 22 (120 golfer limit) This event sells out every year!

For further details about the golf outing **VISIT SEAONY.ORG**

DOB HIGHLIGHT:

Testing Questionable Concrete

By Eytan Soloman, Silman



NYC Buildings

NYC Buildings Department
280 Broadway, New York, NY 10007

Robert D. LiMandri, Commissioner

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Technical

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Purpose: To evaluate the condition of the concrete in structures where the testing performed on the concrete by the testing laboratory has been identified as questionable, and thus must be supplemented by additional testing and evaluation.

Related Code Section(s):	AC	28-116.2.2	BC	1713.1	ACI 214.4R-03
	AC	27-607(a)	BC	1905.6	ASTM C803-03
					ASTM C805-08

Subject(s): Concrete, testing, licensed concrete testing laboratories, evaluation of structures

Where the validity of test results required by the 2008 NYC Construction Codes or the 1968 Building Code performed by a concrete testing laboratory is called into question, additional testing and evaluation shall be required. In accordance with AC 28-116.2.2, and BC 1713.1, the following procedures shall be followed when the Department determines that a structure must comply with this Buildings Bulletin.

Procedure:

1. Identification of structures

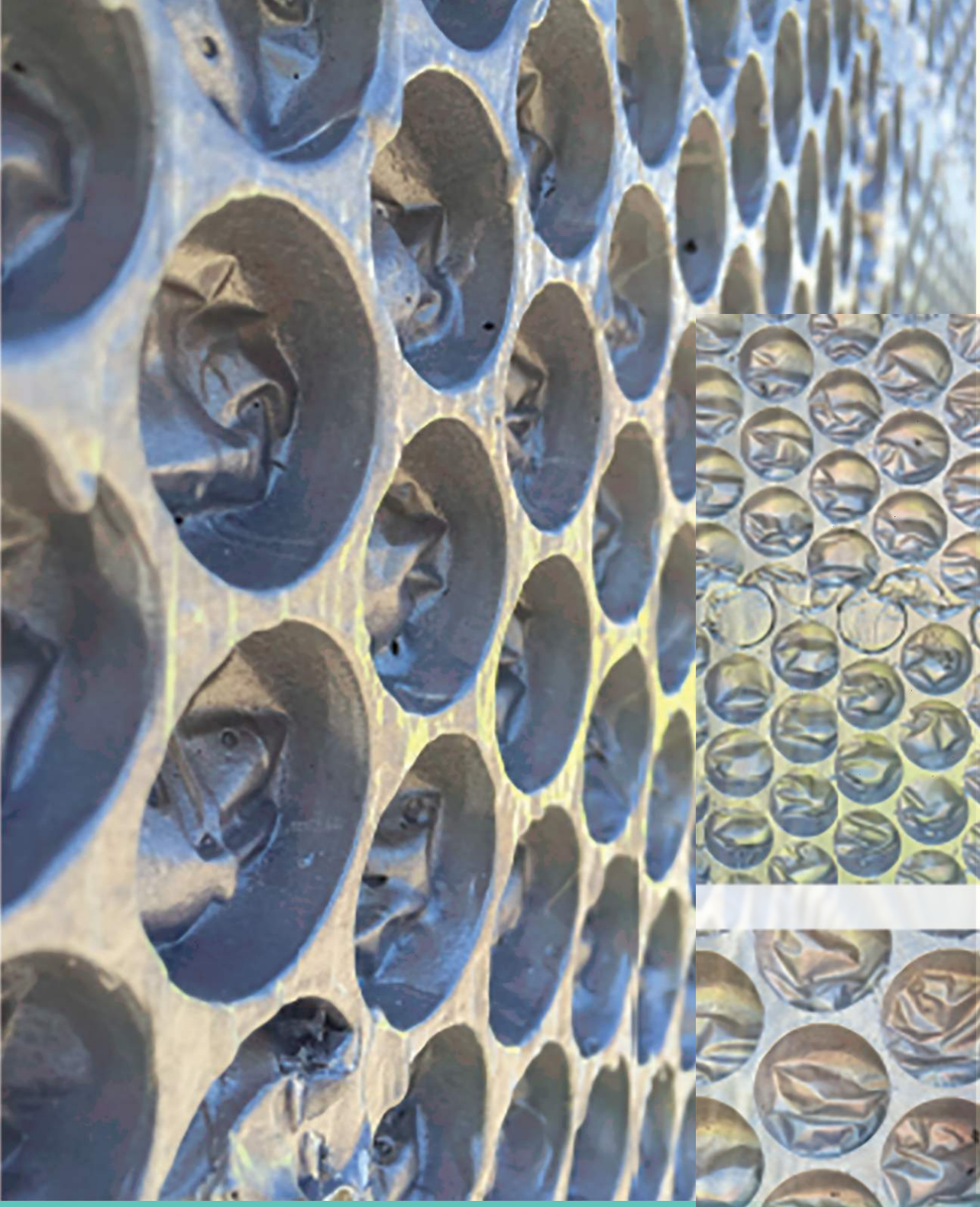
1.1. The Department of Buildings (DOB) will identify the structures where the concrete testing reports of concrete cylinder tests performed per BC 1905.6 or 27-607(a) have been called into question. Such structures shall follow this Buildings Bulletin to evaluate the acceptability of the strength of the concrete as specified in the approved design documents.

1.2. DOB will provide the Building Owner (Owner) with available information regarding specific structures.

2. The Owner shall obtain the services of a qualified Professional Engineer licensed and registered in the State of New York (PE) to assess the concrete used in the structure based on this Buildings Bulletin. The PE shall be acceptable to DOB.

3. Assessment by the PE

In August 2009, NYC DOB published Buildings Bulletin 2009-014 which set guidelines for assessment "of the concrete in structures where the testing performed on the concrete by the testing laboratory has been identified as questionable, and thus must be supplemented by additional testing and evaluation". This direction from the city came in the wake of the scandal surrounding Testwell Laboratories, which in 2008 was prosecuted for falsifying concrete tests and other charges. Before then, Testwell was one of the leading companies in the region for concrete testing, including such projects as Yankee Stadium and the Freedom Tower. The scandal greatly disturbed the construction industry, and the DOB's bulletin provides guidance on how to approach such situations, whether or not directly related to Testwell specifically. The full bulletin can be downloaded from the NYC DOB website.



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WITH A BUBBLE WRAP FORM LINER FOR THE
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536 LaGuardia Place
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