NCSEA
National Council of Structural Engineers Associations

# Structural Connection

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## From Flood Mitigation to Flood Resiliency

### Contributed by Jonathan Hernandez, Director

Numerous studies and presentations have been undertaken for flood mitigation in the wake of Hurricane Sandy. ASCE 24 has set the standard for the minimum requirements for flood resistant design and construction of structures. The New York City Building Code also has Appendix G for Guidelines on Flood Resistant Construction which references FEMA and ASCE 24 but also provides additional requirements.

How do all the Codes and Guidelines actually affect Structural Engineers? We usually say that flood design is the realm of the civil engineer and has to do more with grading and drainage than the design of buildings. With the damage caused by Sandy, however, Building Owners have embarked on a repair and retrofit program to prevent the damage caused to vital infrastructure by flooding. Critical electrical and mechanical infrastructure which have typically been located in basements and lower floor levels are being re-designed and relocated to upper floors of the building. FEMA has also made funds available to undertake this program, pouring significant amounts into hospitals and other critical facilities. This program has certainly been a boon to the engineering and construction industry. However, the question always in the Structural Engineers' mind is "What else do I need to know about all this flood mitigation and flood resiliency stuff?"

To address this issue and to better inform Structural Engineers, the Structural Engineers Association of New York (SEAoNY) presented an all-day seminar titled Flood Mitigation for New and Existing Structures in early February 2016. Amy MacDonald of TT set the tone of the seminar in her introduction, and Chris Cerino and Michael Tumulty of STV discussed Site Evaluation and Assessment.

The Seminar topics included the current applicable codes and requirements, both for the National Codes (FEMA, ICC, ASCE) and the local NYC Building Code. Chris Jones spoke on the National Code issues and Joseph Ackroyd of the NYC DOB discussed the NYC Building Code requirements and issues.

One of the seminar topics, discussing the design for site considerations, was presented by Michele O'Conner and Michael Nilson of Langan, a geotechnical engineering firm. To address the role of incorporating structural design in flood mitigation for buildings, Doug Gonzales of LERA discussed the renovation of the Kimmel Hospital, to protect this critical facility; and Carolyn Weiss of TT discussed the design of the new CUNY/MSKCC hospital project.

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Chung Yeon Won, an architect with SOM, discussed access when flood barriers are deployed and other architectural considerations. John Jordan of Ennead Architects discussed the various products to mitigate flood damage, out in the market at present, and his experience in the use of these products.

In all the discussions, there was a clamor for not just flood mitigation but for real flood resiliency. Resiliency is the capacity to rebound. Structural Engineers need to inform their clients that the Code is the minimum requirement, and to achieve resiliency, the design must exceed the code.

During the ATC & SEI conference in San Francisco, The United States Resiliency Council (USRC) did a presentation on the use of FEMA P58 and ASCE 41 as a system for rating of buildings for earthquake resiliency. I think that there is a need for a similar rating system to be applied to flood resiliency for Building Structures. The structural engineering community should spearhead this system and work closely with USRC to make this a real tool for use in rating buildings for multiple hazards due to flooding.