

Second International Interactive Symposium on Ultra-High Performance Concrete
Extended Abstract (no paper submission)

Title: Smart Walls: Telescopic Structural Walls for Flood Protection

Author(s) and Affiliations:

Jorge Cueto, Ph.D.*
Chief Technology Officer, Smart Walls Construction LLC
1576 Sweet Home Rd, Suite 102A
Amherst, NY 14228
(716) 601-8546
jcueto@smartwallsconstruction.com

Primary Topic Area: Components and Structures

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Telescopic Structural Flood Walls - Proof of Concept Project

Jorge Cueto, Ph.D.,* (corresponding author) – Chief Technology Officer, 1576 Sweet Home Rd, Amherst, NY 14228, USA, Phone: (716) 601-8546, E.: jcueto@smartwallsconstruction.com

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Extended Abstract

The Telescopic Structural Walls are part of a patented technology that allows structural elements to be automatically interconnected when pulled out from their retracted position. The first application of the technology is found in Smart Walls: Fiber-Reinforced Concrete Telescopic Walls for flood protection of cities. Coastal and riverine cities are experiencing an increase in population and an increase in water-related hazards, as a consequence, they have less space for large foot-print flood protection projects. This is where a strong, durable and versatile technology finds its value to provide protection only when needed, and allow daily activities on area to continue when the protection is not needed. The strength, durability and versatility was only found as a combination between the patented telescopic system and the Ultra-High Performance Concrete. This proof of concept project was funded by the National Science Foundation and was executed in collaboration with Lafarge-Holcim and the O.H. Hinsdale Wave Research Laboratory from the Oregon State University, among other parties. The project consisted on building eight specimens that formed an enclosure surrounded by water to simulate a slow-rising flood water scenario. Furthermore, four specimens were tested against simulated storm-surges waves and finally two specimens were tested against simulated tsunami waves. As a result, the telescopic structural walls proved to be structurally suitable to withstand the forces from these three flooding scenarios: slow-rising waters, storm-surges and tsunamis. Current work

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is being done for the detail design of the technology and further tests will be conducted against impacting debris and hurricane forces at the International Hurricane Research Center.

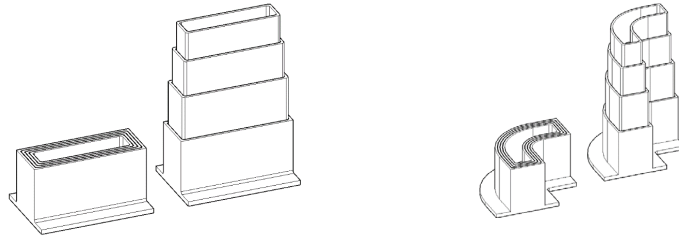


Figure 1. Basic Sketches of the Smart Walls. Left, straight. Right, 90° curved.



Figure 2. Smart Walls Enclosure. a) Retracted, b) Extended



Figure 3. Smart Walls Subjected to Storm-Surge Scenario



Figure 4. Smart Walls Subjected to Tsunami Scenario