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STRUCTURAL COLUMNS

"What is dangerous is not to evolve"

Jeff Bezos (CEO, Amazon.com)

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PRESIDENT'S MESSAGE

Most of us in the engineering, architecture and building construction are happy to see the year 2011 in the rearview mirror. The past four or five years have been the most challenging for this industry in a generation. It has also been an exciting time to be in this field. Building Information Modeling (BIM) is becoming mainstream and changing the way we design buildings and collaborate with our clients, just as computer aided drafting revolutionized the way we produced the drawings in the late 1980's. We also saw the iPad & other tablets bring technology directly onto the construction sites. If you add cloud computing to the mix it seems like we took a giant leap in the use of technology in building design and construction within a few short years.

After months of studying the BIM software, legal issues and other ramifications of switching to a new platform, we made a decision to start using BIM in early 2011. It turned out to be a wise decision as several new projects requiring the use of BIM came up and we were able to meet the challenge head on. We have already completed a couple of projects using Revit Structure and several more are underway. We currently have two engineers and a BIM Technician trained in Revit Structure. Other engineers and drafters in our office are also undergoing training. This is all part of our commitment to delivering the most technologically advanced design solutions to our clients.

Last year, Ms. Donata Williams, P.E. was promoted to the position of Vice President/Director of Engineering. Besides heading our BIM division, she has been working on revamping our drawing standards and design procedures. I also want to take this opportunity to congratulate her on completing her MBA from University of Florida. I am certain you will see the results of her energy and enthusiasm in our design products in the coming months and years.

Along with Donata, Ms. Lidia Maciuc joined me at the corporation's Board of Directors in 2011. Lidia has been with the firm for nearly five years and has been the firm's accountant, office manager, marketing coordinator and HR manager. I consider this as a major step in becoming a Business that takes care of Engineering Services and its clients, as opposed to an engineer engaged in business. As we grow and compete with larger firms, we recognize that it is simply not enough to be great engineers; we also need to be good business people as well. In addition to excellent engineering services, our clients can count on timely and accurate marketing data, invoicing and other support to meet your goals.

I am hopeful for this year and beyond as the real estate mess is cleaned up through foreclosure process and the pent up demand for new construction becomes the catalyst for a new cycle of growth. We would probably see more of renovation and remodeling of foreclosed commercial and residential real estate bought cheaply from banks before new buildings are added. Nonetheless, it would start a new growth cycle and lead to better time for all of us. We are already seeing a few projects long delayed for financial reasons restart in the past few months. Real estate prices and construction costs have become reasonable again and it is making many businesses start thinking about investment in new facilities. In South Florida, the developers are trying to take advantage of the hot rental market. Let's hope this trend continues and leads to more prosperous times for the A/E/C industry.

I hope you enjoy reading this newsletter and I do hope it will help you understand our efforts to serve you better. We wish you a very happy, healthy and a prosperous 2012!

Sri S. Sritharan, P.E.

FEATURED PROJECT

Urban League of Broward County: Community Empowerment Center

Original Architect: Judson Architecture, Inc.

Successor Architect: Design2form, Inc.

Owner: Urban League of Broward County

Contractor: D. Stephenson Construction, Inc.

Construction Cost: $5 Million

The **Community Empowerment Center** is a project that has been a long time in the making for the Urban League of Broward County. Located in Fort Lauderdale next to the African American Research Library & Cultural Center, the new one and two-story facility has 30,000 square feet housing office space, training facilities, meeting rooms and support space. Part of the one-story space is designed for future second floor addition. The framing of the building consists of composite steel floor system and steel bar joist roof system supported by load bearing tilt-up concrete panels and HSS columns. There is a large entrance canopy with steel framing composed of welded HSS members. The lobby curtain wall is backed with a structural steel frame.

The Urban League building had its own set of design challenges. The entrance lobby to the building has a clear height of approximately 39 feet with an expansion joint on one side and an architectural desire to keep the columns as small as possible. In order to create a diaphragm at this high roof level that could withstand the lateral loads, the high roof is framed with cast-in-place concrete beams and slabs. The east side of the building required a bearing line that spans 72 feet supporting floor loading, terrace loading, and a wall that supports the roof above. The difficulty with this 72 foot support line was not only the span length, but also the 4 foot maximum depth of the supporting structure. The solution was to use a 4 foot deep truss made with heavy WT shapes top and bottom chords and double angle web members. All the connections had to be welded and a full penetration weld was used for the truss splice.

In addition, there were challenges that arose from the original architectural firm going out of business. S&F worked closely with the successor architect, the owner and the contractor to quickly resolve coordination issues and incorporate the changes required to obtain a permit for the successor architect drawings.

BIM Corner

What is BIM?

Building Information Modeling is the process by which information is collected, manipulated and analyzed for the purpose of designing, constructing and operating a building project.

BIM Terminology

2D – Refers to traditional two dimensional paper drawings displaying multiple views but only with two dimensions such as height and width, height and depth, or width and depth.

3D – Refers to three dimensional illustrations that include height, depth, and width. 3D provides a more realistic view of a space.

4D – Four dimensional includes the integration of time. This allows for the incorporation of scheduling.

5D – The fifth dimension adds quantity and cost. It is not necessary to have 4D before having 5D.

Parametric Modeling – This is the concept that a model is object based with real world attributes instead of being based on lines. This allows for a constant relationship to be maintained between elements as the building model is manipulated.

CHANGES IN THE WIND!

If you glanced at the 2010 Florida Building Code, you've probably noticed that the Wind Loads section (Sec. 1620) looks quite different from the previous edition. This is the section that establishes the design wind speeds for the High Velocity Hurricane Zones, which include Broward and Miami-Dade counties. Whereas FBC 2007 listed a single design wind speed for each county (140 mph for Broward and 146 mph for Miami-Dade), FBC 2010 lists three design wind speeds for each county: 156 mph, 170 mph, and 180 mph in Broward; and 165 mph, 175 mph, and 186 mph in Miami-Dade.

So, you might be asking, "Should I expect more shear walls in future projects? " Or, "Will my preferred windows fail to meet the new local code requirements?"

Fortunately, the answer to both of those questions is no. There are two fundamental concepts one must understand to make sense of the changes. Firstly, the three wind speeds for each county correspond to different Risk Categories, formerly known as Occupancy Categories. Buildings with the highest hazard to human life in the event of failure, such as a hospital or water storage facility, are in the highest Risk Category (IV) and thus must be designed for higher wind speeds. Buildings with the lowest hazard to human life, such as a barn or greenhouse, are in the lowest Risk Category (I) and can be designed for lower wind speeds. Previously, the loads calculated from the lone wind speed were baseline loads for Occupancy Category II, which had to be multiplied by an Importance Factor to increase or decrease them for other Occupancy Categories. By choosing the appropriate wind speed from the new code, engineers can now eliminate that step.

Secondly, the old wind speeds were calculated such that after being converted to the appropriate Occupancy Category, they had to be amplified by the code specified load factor to reach design level. The new wind speeds are calculated such that they are already mapped at design level for each Risk Category and hence need not be amplified. In Broward County, the middle value of the three new wind speeds, 170 mph, is the design wind speed for Risk Category II. While this is higher than the 140 mph wind speed in FBC 2007, it does not need to be amplified further, as was the case with the old code. Comparing the new design wind pressures to the amplified old wind pressures reveals that the new pressures are 8%-15% *lower* than the old pressures for most cases in South Florida. This is not by accident. After analyzing data collected from recent hurricanes, code writers found that wind speed maps in previous codes were slightly conservative and redrew the maps to reflect this.

So, worry not! Though the newly published wind speeds are higher than before, the loads calculated from them will generally be lower. If you have any questions or would like to learn more about these changes, feel free to contact our office.

EMPLOYEE CORNER

Achievements

Congratulations to **Oliver Lopez** on his licensure as P.E. in Florida. He passed the 2 part structural exam last year.

Donata Williams, P.E. has been elected to the Board of Directors of Florida Structural Engineers Association. (F.S.E.A)

Milestones

Congratulations to **Tanmay Kadam** and **Eduardo Ecenarro** on completing 5 years with S & F Engineers, Inc.!

New Additions

Nicholas Henriquez joined our engineering team in November 2011. He graduated with Master Degree from University of Florida.

Welcome aboard, **Christine**! The friendly voice that you hear on the phone when you call S & F is likely **Christine Taylor**, our new office assistant.

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We welcome your comments and any suggestions for future topics related to structural engineering. Please contact Christine@sfengineers.com