# NEWS

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**Wexler & Associates' Structural Design Sends Hunts Point Market Into a Deep Freeze**

Adaptive re-use of an existing foundation was only the first of many challenges facing the designers of a unique new structure in Bronx, New York, that surely ranks as one of the world's largest "refrigerators." Completed for occupancy in October, the $17 million, 130,000 sq. ft. project is a state-of-the art food distribution center believed to be the largest facility of its type. Located on land leased from the city of New York, this addition to the existing Hunts Point Cooperative Market is the new home to three purveyors of meat and other food products, joining a market of 46 other wholesale meat companies. With a footprint measuring 420 x 250 feet and a height of 40 feet, the facility is essentially a giant freezer box, which Cybul & Cybul Architects of Edgewater, New Jersey, designed to function more like a machine than a building. Extremes of temperature and the need to withstand concentrated loads from forklift operation in turn demanded innovative solutions from structural engineer Wexler & Associates of New York City.

The structural design for the Hunts Point Market incorporates a dual solution using steel framing and connections to support the mezzanine, administrative offices and loading dock. Pre-cast concrete columns used for the primary, refrigerated structure were selected for the superior performance of concrete under extreme temperature differentials, as well as to minimize costs for fireproofing steel columns.

The structure's concrete slab foundation uses remnants of a foundation poured in the 1960's for a fish market that was never built. Wexler developed techniques for testing and reinforcing the existing foundation to support anticipated loads of 800 pounds per square foot from storing frozen food

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on floor-to-ceiling storage racks. After systematically measuring the deflection of existing concrete floors, piles were added where needed to strengthen the foundation. The cost benefits related to preserving the existing foundation are estimated at seven figures.

To avoid condensation problems, structural-grade insulation was used to create a thermal break between the foundation and the superstructure of the building. Each column and the concrete floor rest on six inches of 1,000 psi rigid insulation. A heating coil buried in two inches of sand at the bottom of the floor sandwich will be used to maintain consistent sub-floor temperature. Fork lift operation will generate highly concentrated loads, requiring special reinforcement in the six-inch concrete slab poured over the thermal break. The solution included pouring the concrete in a checkerboard pattern calculated to minimize the potential for cracking. Less volume of concrete in each square of the checkerboard also means less moisture, reducing shrinkage by approximately half versus standard concrete floors.

Similarly, to minimize shrinkage of structural elements when the building is cooled to its below-freezing operating temperatures, the structure is designed as a grid of separate, smaller "buildings" separated by expansion joints, with discrete wall elements for each sub-unit laterally braced for earthquake and wind loads. This system spreads the total shrinkage over several smaller joints rather than one large joint, which would be difficult to insulate and waterproof. A precise cool-down schedule was also developed to prevent cracking of concrete floors and minimize stress on steel member connections.

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