North Shore at Canton

Baltimore, MD

Technical Report 3

Lateral System Analysis

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Structural
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Executive Summary

North Shore at Canton is a four story town home structure built on top of a concrete pier in Baltimore harbor. For the purposes of this report, the building can be considered as three different structures. The concrete pier will make up the foundation, the first floor is a rigid steel frame, which is pinned to the pier, and the second, third and fourth floors are comprised of a bearing/shear wall system, made up of steel studs and gypsum sheathing. The floor system for the first floor is made up of pre-cast hollow core planks, which are welded to the steel frame, and a 2-1/2" topping of concrete. The second, third, and fourth floor systems are made up of pre-engineered floor trusses topped with ¾" OSB, which rest on the bearing/shear wall.

An analysis was made to determine the capacity of the lateral force resisting system. Both wind and seismic loads were calculated and compared based on the Allowable Stress Design equations as given in the IBC 2003. The loads were distributed to the building based on tributary area, the shear walls were analyzed and then the steel frame, the forces on the frame were to come from the lateral load at that level, as well as the resulting base shear and resulting moment that are caused from the three stories of shear walls that sit on top of it. The loads then transferred from the columns into the pier bents. The shear capacity of a typical shear wall was considered for this report, as well as story drift, overturning moment, also the steel frame was analyzed using a computer model. The pier structure was assumed to be able to carry the loads transferred from the columns.

There are two span directions for the shear walls, and it was determined that the short spanning shear walls could carry the story forces, while the long span could not. Over-turning moment was not a factor, as the dead load of the structure provided enough resisting moment against the story force moment. Also Lateral drift was not an issue as the building deflection was within limitation, however it should be noted that some calculations were based on assumptions and should be verified.