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Boyd's Bear Country
Pigeon Forge, TN



Technical Report 3

Lateral System Analysis and Confirmation Design

Executive Summary:

Boyd's Bear Country, located in Pigeon Forge, Tennessee, is designed as a multi-functional space and tourist attraction for Boyd's Collections Ltd. The 112,620 square foot building houses three floors of retail space with multiple cashier and information desks, warehouse storage, a loading dock, a full sized restaurant, food court, ice cream parlor, special events areas, and offices.

Boyd's Bear Country is a building constructed on many materials. The lateral system of the building is no exception and this report investigates the specifics of this system.

Primarily, lateral loads are resisted by a series of 8 concentric steel braced frames, 4 in each direction of the structure. Five of these eight frames also incorporate masonry piers and masonry walls within the lowest story. In both types of frame, lateral forces are finally transferred to the foundation of the building in both strip and spread footings.

Loads applied to the building in the redesign follow IBC 2003, ASCE 07-05 and Allowable Stress Design. The controlling load case for this design was of dead load, live load, and earthquake loads. This loading case, among others was investigated using RAM Structural System and Risa-3D.

The original design of the building did not consider the relative stiffness of frames and distributed lateral loads equally to each frame. The redesign of the structure considered relative stiffness differences in the frames as well as adjustments in loading as required by current codes. Under these changed conditions, the original design of the building met code requirements and industry standards as built, including a control value of $H/400$ for drift.

Overtopping and torsion as created by the lateral loads on the building do not greatly influence its design. Overtopping moments and induced couples are easily resisted by the spread footings below each frame, and are reduced by the weight of the structure and most notably the weight and strength of the masonry portions of the frames. Torsion on the building is negligible when compared to base shear and story shear created by the same loads.