



Executive Summary

American Eagle Outfitters: Quantum III is a steel framed office building located in the South Side Works of Pittsburgh, Pennsylvania. Design changes were introduced including moving the building to Oakland, California and increasing it's profile by two stories. This report analyzes the structure of this building and it's adequacy on the basis of currently accepted national codes, economy, and flexibility.

Lateral systems were designed to withstand seismic category E design forces. This was achieved through numerous framing layout iterations and a preliminary beam, column, and brace design. Torsion, redundancy, and p-delta effects were all taken into consideration for design. The completed preliminary analysis was checked for story drift limitations for both wind and seismic forces to demonstrate the difference in Pittsburgh, Pennsylvania and Oakland, California requirements.

The redesign of building shell elements was completed as well. Window assemblies were analyzed for their mechanical and architectural properties. A double glazed window with a spectrally selective tint was chosen. Satisfying a wide range of aesthetic uses, it also provides a U-factor of 0.3, greatly reducing heating and cooling load losses for QIII. The building scale was changed from 67' to over 96' tall, possibly requiring rescaling of building elements. Additionally, shell elements were changed to better reflect the aura of Oakland, California.

Mechanical system design was performed for the existing and proposed Quantum buildings. They were compared based on their overall efficiency and heat loss through curtain wall systems. The added two floors greatly increased heating and cooling loads, so efficiency was calculated based on relative percentages.

The following report describes the considerations and details that composed the studies outlined above.

