

Executive Summary

In order to better understand the purpose and benefits behind completing a performance-based design and utilizing a non-traditional lateral system, a prescriptive approach to the design in accordance with ASCE 7-10 was performed. This approach brought to light the cost benefits in using a prescriptive approach, but also brought to light many of the drawbacks.

Although both systems have their pros and cons, the existing system proves ideal for predicting building behavior in the case of seismic loading as well as for serviceability and occupant comfort. In utilizing a prescriptive approach, the type of nonlinear behavior could be better estimated in the existing system, failure modes were addressed in a more specific manner, and occupant comfort could be ensured. This design exceeds the minimum performance requirements and increases the chance that the building will be quickly re-inhabitable after an extreme earthquake.

The alternative concrete core and outrigger system designed is not able to offer the same performance objectives, but it does make for a more economical solution, as well as a more straight-forward construction process. On top of that, time and money is saved in the design process from eliminating the need for a PEER Review.

