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TECHNICAL REPORT THREE

LATERAL SYSTEM ANALYSIS AND CONFIRMATION DESIGN

INTRODUCTION

This third technical report presents a detailed analysis of the current lateral force resisting system found within Memorial Sloan-Kettering Cancer Center. Located in Somerset County, New Jersey, this four story health-care facility will open its doors in the summer of 2006 to serve as one of the premiere cancer treatment centers in the nation. MSK's infrastructure is made up of braced steel framing supported by a concrete foundation. It is laterally supported by four identical systems composed of diagonal bracing and shear walls. This report goes into great depth analyzing this system against the seismic and wind lateral forces developed from ASCE 7.

The first section of this report provides a structural description of Memorial Sloan-Kettering, focusing mainly on its lateral system. This discussion goes into detail describing the locations, connections, member sizes, and footings for each of the four systems. The next section of this report focuses on lateral load development seen on the building. ASCE 7 was used to calculate the seismic and wind forces for each floor, along with all relevant load cases. From these calculations, it was determined that the seismic forces controlled the lateral loading in both directions.

To help analyze the lateral loading on MSK, a model of the building was created in the ETABS computer program. This program helped calculate the building's total drift, displacement, base shear, and overturning moments. It was also used to verify the accuracy of the seismic and wind loads calculated from ASCE 7. Hand calculations were then performed to ensure the values outputted from ETABS was accurate and reasonable. Shear strength, torsion, and lateral members were also checked through hand calculations to determine whether or not the system is adequately designed.

The report was able to conclude that the lateral force resisting system in MSK is adequately designed to resist the lateral forces seen in northern New Jersey. After verifying and enhancing the seismic and wind load values from Tech 1, it was obvious that seismic forces would control the lateral loading of the building. Because of this, all hand calculations performed to check the lateral system strength used those seismic forces. From those calculations, along with the ETABS model, it was established that Memorial Sloan Kettering is sufficiently designed to resist its lateral forces.