TO: Professor Oral Buyukozturk
FROM: Raquel Escatel
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SUBJECT: Term Project Proposal

The term project I'm interested is the seismic design of concrete structures. Design for earthquakes differs from design for gravity and wind loads due to the higher probability of affecting the structure's geometry. With the recent discovery that moderate earthquakes can trigger larger ones on adjacent faults, vulnerable cities, such as Los Angeles, may have to prepare for earthquakes with magnitudes of up to eight on the Richter scale (1). Consequently, engineers are currently in search of a material that is economic and resistant to natural external forces.

The Importance of Members and Materials

Members designed for seismic loading must be ductile and able to dissipate energy without decreasing the strength of the structure. To ensure the ductility of members subject to shear and bending caused by earthquakes, spiral reinforcement is used as confinement for concrete. Although this is the principle method used for seismic design, I have found many resources that will detail other options and their benefits as well as disadvantages.

The investigation of mixing rubber with Portland cement to make concrete is of particular interest as well. So far, research shows that although the concrete's compressive strength is reduced, there is an increase in ductility, toughness, and crack resistance. The improvements of these three factors are ideal for structures in an environment prone to earthquakes and high wind loads (5).

Results of Improper Earthquake Design

I would like to investigate the failure of specific structures due to earthquakes, such as those demolished by the 1985 Mexico City Earthquake. I also plan to use an analysis program to demonstrate the effect of concrete strength and reinforcement on the deformation of structures that have survived earthquakes.

References

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(6) Seismic Design of Reinforced and Precast Concrete. Robert E. Englekirk
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