

Final Project Summary — PEER Lifelines Program

Project Title—ID Number	<i>Application of Simplified Model to Assess Structural Behavior of Mill Type Bldg—506</i>		
Start/End Dates	3/19/01 – 8/31/01	Budget/ Funding Source	\$10,000 / PG&E/CEC
Project Leader (boldface) and Other Team Members	Nazir (ABS/EQE Intn'l)		

1. Project goals and objectives

In this study wall out of plane anchorage forces in certain type of sub-station buildings were examined.

2. Benefits of the results of this project to develop technologies and protocols to mitigate the vulnerability of electric systems and other lifelines to damage directly and indirectly caused by earthquakes. Also, benefits to develop assessment techniques to evaluate damage to electric systems caused by earthquakes and to assess fiscal impacts due to the loss of electric service to the community.

The results of this project can benefit seismic design of certain type of electrical substation buildings.

3. Brief description of the accomplishments of the project

It was found that the wall out of plane stiffness, diaphragm stiffness, and relative stiffness of two diaphragms have significant effects on the wall out of plane anchorage. Recommendations were presented on a proposed design equation.

4. Describe any instances where you are aware that your results have been used in industry

This study is based on PG&E substation “K” located in San Francisco, which represents a typical substation building structure built in 1920s. Thus, the results of this study are directly applicable to utilities.

5. Methodology employed

Two separate analyses were performed: (a) SAP2000 three dimensional dynamic model; and (b) simplified multi-degree-of-freedom spring model. Variations in the following parameter were made to cover various different conditions: wall to diaphragms connection, wall out of plane stiffness; wall foundation rocking; diaphragm stiffness; and diaphragm relative stiffness.

6. Other related work conducted within and/or outside PEER

7. Recommendations for the future work: what do you think should be done next?

8. Author(s), Title, and Date for the final report for this project

Nazir, “A Simplified Analysis Method for Wall Out of Plane Anchorage Forces”.

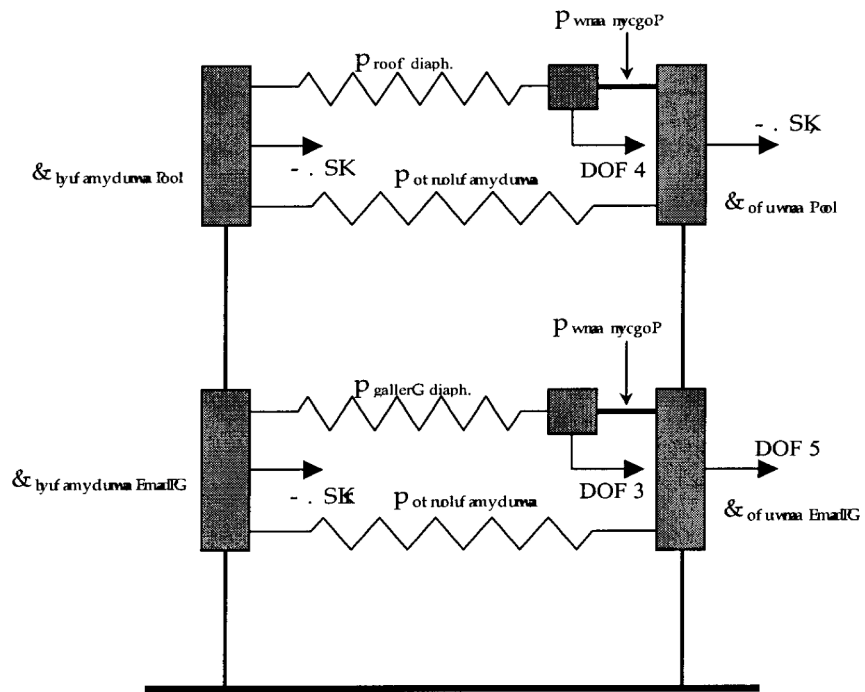


Figure 2-1. Simplified spring model.

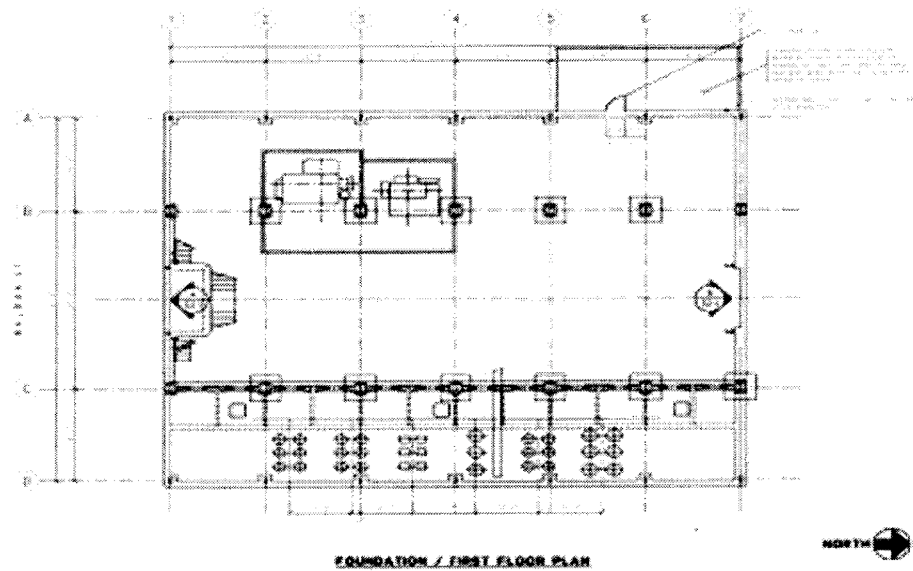


Figure 3-1: First Floor Plan