SEMINAR ANNOUNCEMENT

Parkfield Pipeline Project

by

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At 11:30am, on 29th March 2000 (Wednesday) in Room 140 Ketter Hall,
Department of Civil, Structural and Environmental Engineering

The performance of pipelines when subjected to earthquake effects—including traveling waves, fault offsets and lateral spreading associated with liquefaction and slope failures—has received considerable attention. Beginning with design considerations for the Trans Alaska Pipeline, the subject received renewed emphasis in the aftermath of the 1971 San Fernando Earthquake. Field and laboratory observations have led to the formulating mathematical models of pipeline performance that can be used as a basis of design and retrofit of individual pipeline segments and in damage modules for network simulations. Collection of physical data on pipeline performance from Loma Prieta and Northridge earthquakes have illuminated the roles of soil stability, surface rupture and pipeline material and condition. Modeling efforts have similarly advanced. However, there is lacking specific data on how ground movement is translated into pipeline deformation. Laboratory scale testing has not been productive due to the difficulties of simulating boundary conditions, realistic soil deformation and realistic pipeline surface conditions. The purpose of the Parkfield pipeline experiment is to obtain data at field scale under actual earthquake conditions.

The reason for siting an experiment at Parkfield, CA is to capitalize on the predicted recurrence of a M6 or larger earthquake. The prediction is based on a regular occurrence of earthquakes originating in the zone between a locked section (Cholame section) of the San Andreas Fault and a creeping section to the northeast of Parkfield. The USGS has extensively studied and instrumented the region which not only adds confidence to the decision to site the experiment there, but also enriches the data that will be collected. Despite best efforts to pinpoint the window of maximum likelihood for the earthquake between 1988 and 1993, there has been no recurrence of the predicted M6 earthquake in the Parkfield region. Two smaller earthquakes, having Magnitudes about 4.6 and 4.8, occurred without being followed by the larger earthquake. Ground motions and co-seismic creep occurred as a result of the 1989 Loma Prieta Earthquake; due to the distance of 175 km between Parkfield and the epicenter, the amplitude of motions was small.

This project will provide critical data for calibrating design and analysis methods that will eliminate unnecessary conservatism or risk of failure for individual pipelines and will also validate modules needed in system-level and regional risk assessment and loss mitigation studies for pipeline networks.

This seminar will discuss the background and illustrate present status of the pipeline experiment.

All interested are invited. Refreshments will be served at 11:20am.