

REGIONALIZED SHEAR VELOCITY MODELS BENEATH  
THE PACIFIC OCEAN FROM LOVE AND  
RAYLEIGH WAVE DISPERSION

by

Guey-Kuen Yu, B. Sc., M. S.

A Digest Presented to the Faculty of the Graduate  
School of Saint Louis University in Partial  
Fulfillment of the Requirements for the  
Degree of Doctor of Philosophy

1978

inversion method. The results show that both the average shear velocity and thickness of the lithosphere increase with increasing age of the ocean-floor within the first 100 million years after its formation. After 100 million years, the lithosphere continues to gradually thicken, whereas the shear velocity no longer changes. Separate inversions of Love and Rayleigh wave velocities show that polarization anisotropy occurs in both the low-velocity zone and the lithospheric lid beneath the Pacific. A comparison of synthetic seismograms with observed records, supports the existence of this polarization anisotropy in the upper mantle beneath the Pacific.

From the comparison of the shear velocity models in four regions derived from the inversion of Rayleigh wave velocities, it is clear that the shear velocities at depths from 30 to 115 km and from 180 to 250 km increase rapidly with age, whereas the shear velocity at depths between 115 and 180 km is nearly the same throughout the entire Pacific. A low-velocity zone in the lithospheric lid is also obtained from this inversion.