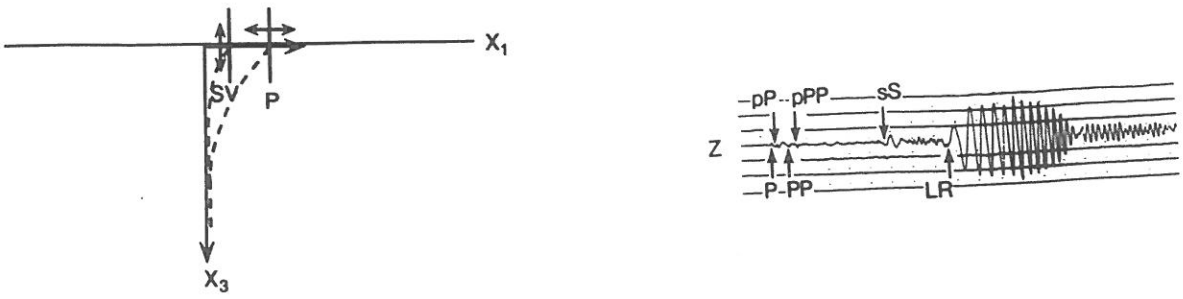


Simultaneous existence of evanescent *P*- and *SV*-wave energy traveling horizontally along a free surface produces the interference surface wave called a Rayleigh wave.

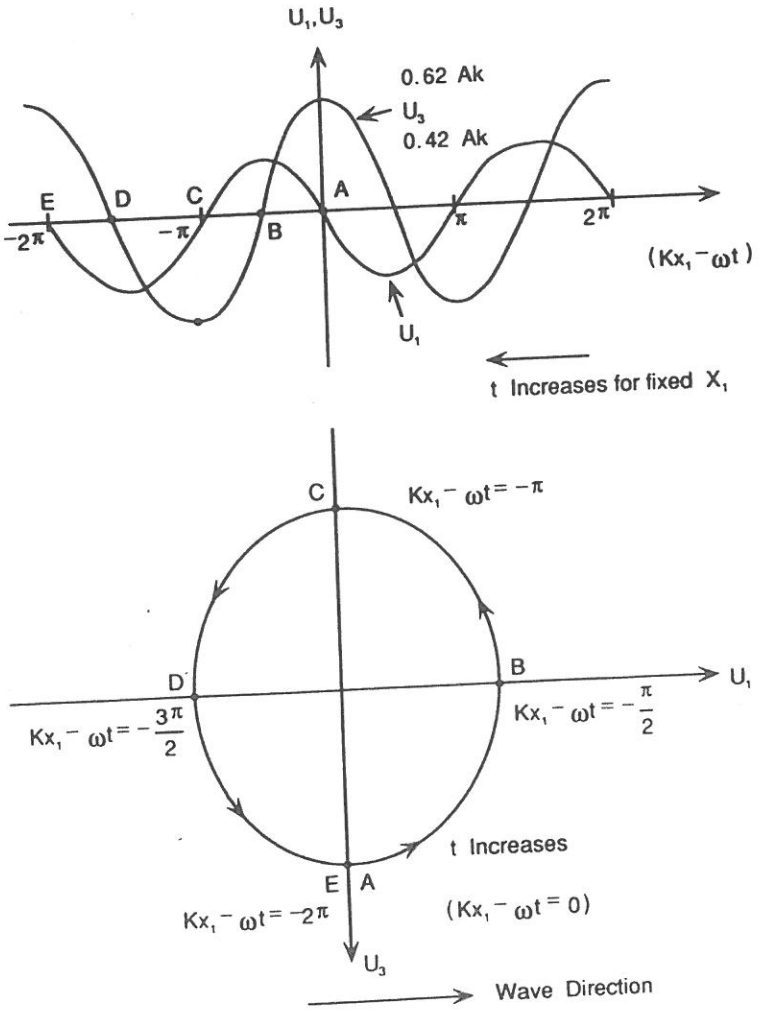
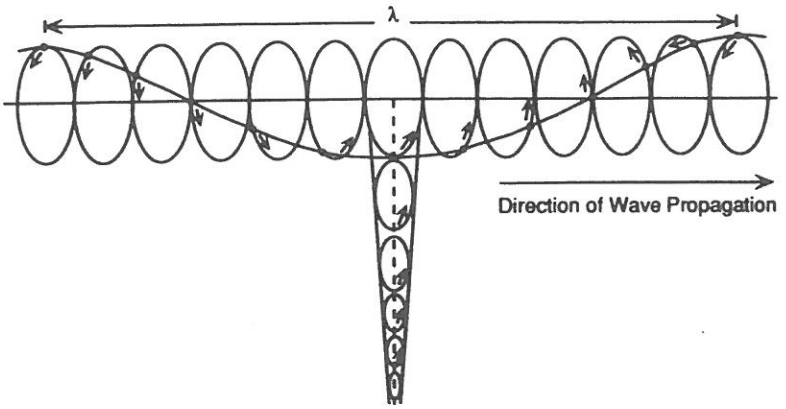


FIGURE 4.5 (Top) Plot of Eq. (4.27) as a function of the phase argument $(kx_1 - \omega t)$. (Bottom) Behavior of an individual particle as a function of time. The surface motion is retrograde elliptical.

$u_1 = -0,42\ Ak\ \text{sen}(kx_1 - \omega t)$

$u_3 = 0.62\ Ak\ \cos(kx_1 - \omega t)$



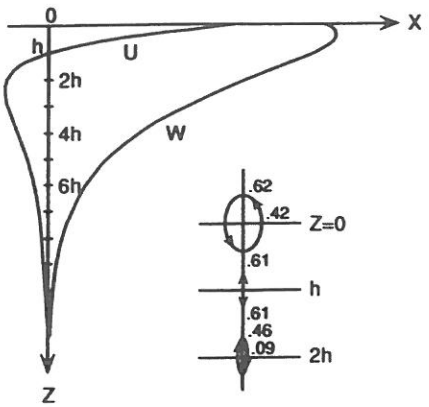


FIGURE 4.6 (Top) Rayleigh-wave particle motions over one wavelength along the surface and as a function of depth. (Bottom) Horizontal (u) and vertical (w) displacements of Rayleigh waves in a homogeneous half-space. The particle motion is retrograde elliptical above depth h and prograde elliptical at greater depth. (From Sheriff and Geldart, "Exploration Seismology," Vol. 1, History, theory, and acquisition. Copyright©1982. Reprinted with the permission of Cambridge University Press.)

Love Waves

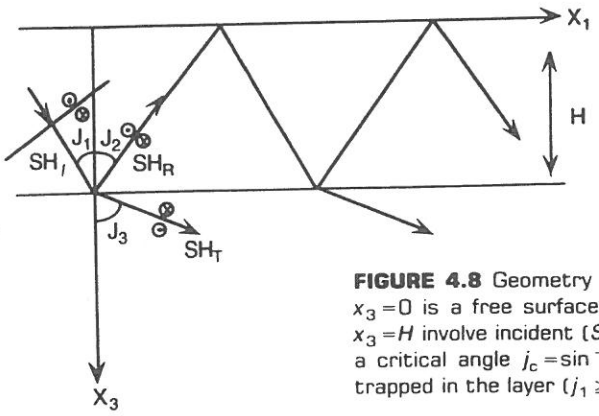
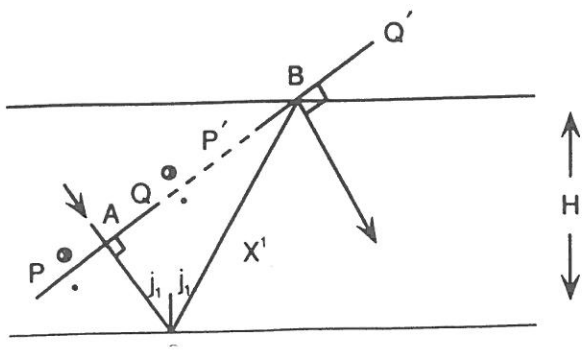


FIGURE 4.8 Geometry of SH waves that repeatedly reflect in a layer over a half-space. $x_3 = 0$ is a free surface, and the layer thickness is H. Interactions with the boundary of $x_3 = H$ involve incident (SH_I), reflected (SH_R), and transmitted (SH_T) SH waves. For $\beta_1 < \beta_2$, a critical angle $j_c = \sin^{-1}(\beta_1/\beta_1)$ will exist beyond which SH reverberations will be totally trapped in the layer ($j_1 \geq j_c$).



$$X' = \frac{H}{\cos(j_1)}$$

seen in the horizontal and vertical components, respectively.
In this particular case, the waves traveled along a mixed, oceanic and continental propagation path.

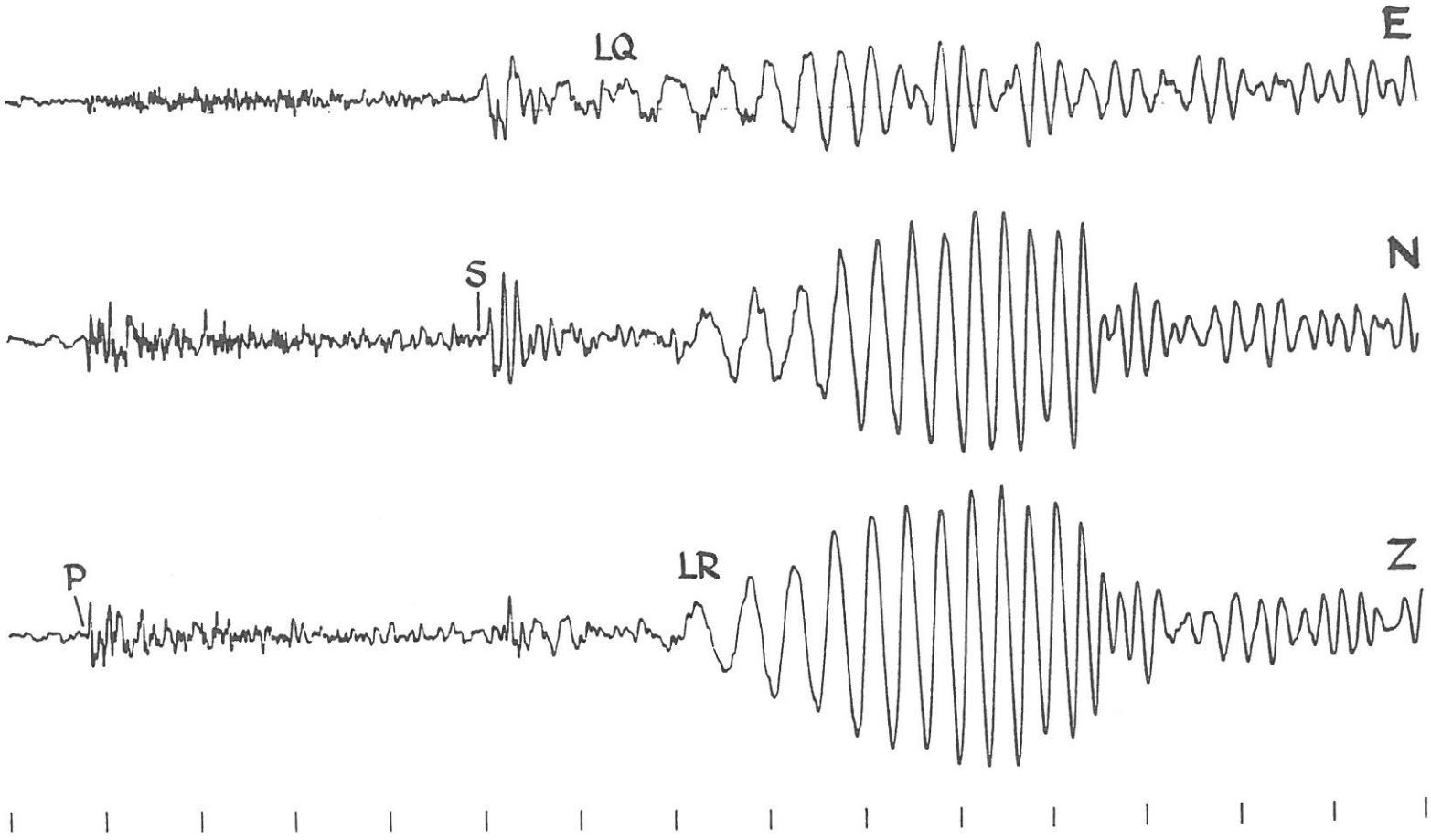


Plate 25. Broad-band three-component, displacement seismogram from the Norwegian Sea earthquake on July 27, 1976 (m=5.1, h=9 km). The records were made at GRF, Bayern, FRG, at an epicentral distance of 23°. All three channels show simple and clear patterns of *P* and *S* waves with distinct onsets as well as of dispersed surface waves. Note that while the vertical channel displays the Rayleigh wave train, Love waves, which precede the recorded *LR* by one minute or so, are well recorded on the E-W component. The strong surface waves indicate a shallow focus event. There is 1 minute between successive time marks at the bottom of the plate.

telesismo
rango $10° < \Delta < 105°$

$\Delta = 23°$ foco superficial.