Preliminary discussion: propagating vs standing gravity waves

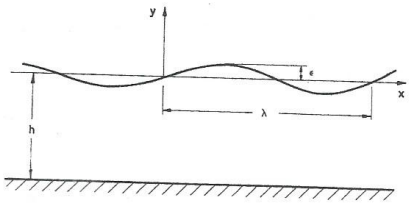

FIGURE 6.2
Parameters for pure sinusoidal waveform.

$$\eta(x,t) = \varepsilon \sin\frac{2\pi}{\lambda}(x - ct)$$

$k = 2\pi/\lambda$ = wave number

c = wave speed

Wave speed depends on water depth

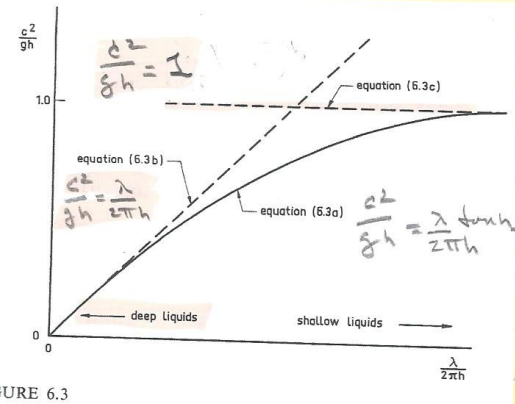

FIGURE 6.3
Propagation speed c for small-amplitude surface waves of sinusoidal form.

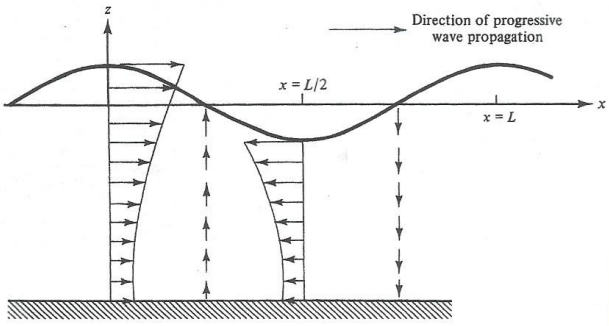

Figure 4.1 Water particle velocities in a progressive wave.

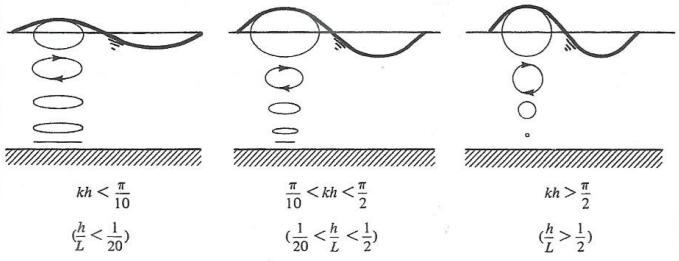

Figure 4.3 Water particle trajectories in progressive water waves of different relative depths.

Standing wave: Superpose two travelling waves moving in opposite direction

$$\eta(x,t) = \frac{1}{2}\varepsilon\left[\sin\frac{2\pi}{\lambda}(x - ct) + \sin\frac{2\pi}{\lambda}(x + ct)\right]$$

$$= \varepsilon \sin\frac{2\pi x}{\lambda}\cos\frac{2\pi ct}{\lambda}$$

$\omega = 2\pi c/\lambda$

$f = \omega/2\pi$

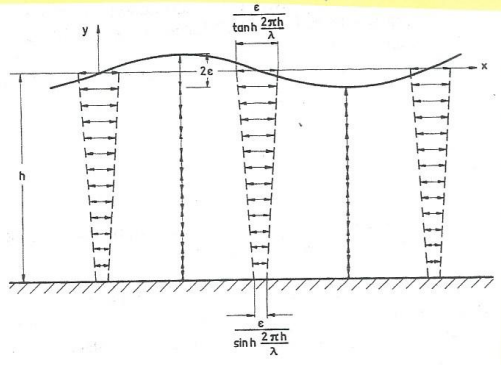

FIGURE 6.8
Particle trajectories induced by a sinusoidal standing wave of amplitude ε and wavelength λ.