

Why do waves break?

How a wave begins?

Generating force

- wind
- density
- earthquakes
- tidal forces

Restoring force

- surface tension
- gravity

Wave anatomy

(Figure 10.2)

* wave period = time required for two successive crests or two successive trough to pass a point in space

Wave motion (Figure 10.3)

- flow of motion or energy not water
- water moves in circular path or orbit
- @ depth of $\frac{1}{2}$ wavelength orbital motion is almost zero

Wave speed

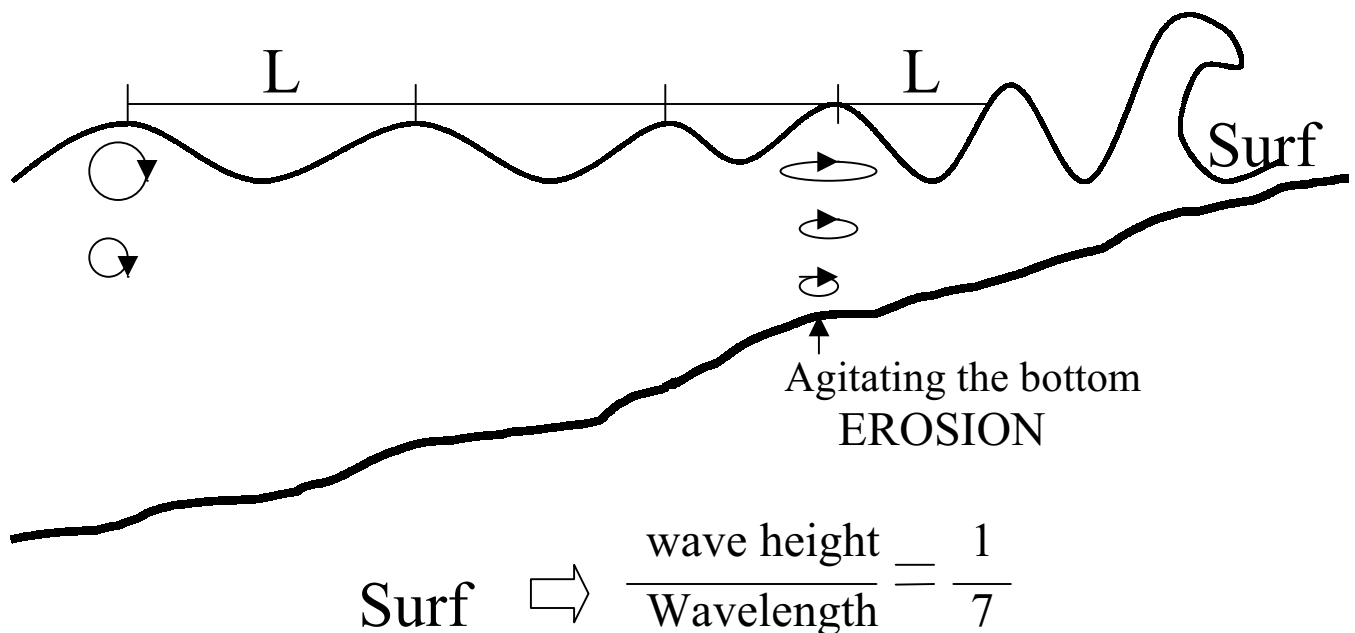
Speed = wavelength / wave period

$$C = L/T \text{ (feet/sec, or meters/sec...)}$$

Deep water waves $D > \text{wavelength} / 2$

Intermediate water waves

Shallow water waves $D < \text{wavelength} / 20$



Wave steepness = height / length, $S = H/L$

Breakers - plunger (narrow, steep beaches)
- spiller (wide, flatter beaches)

Waves that originate in Storm centers (Figure 10.11)

- progressive wind waves
(have speed and direction)
- travel with different speeds



sorting or dispersion



swell – faster, long period waves, appear as uniform pattern of crests and troughs; carry considerable energy

Wave Height

- 1) wind speed
- 2) wind duration
- 3) fetch (distance over water that the wind blows in a single direction)

Rogue Waves

Episodic waves – abnormally high waves
- combination of waves, currents and changing depths

* Constructive and destructive interference
See Figure 10.16

* Wave refraction, reflection and diffraction

Refraction or wave bending

- Occurs when one end of the wave crest comes into shallow water and “feel the bottom” and the other end is in deeper water.

Reflection

- waves reflect from straight vertical barriers and pass through the incoming waves.

Diffraction

- spread of wave energy sideways to the direction of wave travel

Water transport in the surf zone

- shoreward motion of the water particles in crests greater than the return at the troughs (water particle orbits).
- Water flows towards the beach and along the beach
- Seaward return of water occurs in narrow regions that are called **rip currents**.