Lecture 4

Mechanical waves

Pre-reading: §15.1–15.2

Mechanical Waves

Transverse

Longitudinal

Trans. + Long.

Figures courtesy D. Russell
Types of earthquake waves

General Properties of Mechanical Waves

- Need to distinguish medium from particles
- shape of pattern (pulse, continuous, standing wave)
- speed of wave (or pattern)
- energy transmitted (related to amplitude)
- number of dimensions (rope; pond; speakers)

§15.2
Periodic Waves

- Created by continuous, sinusoidal pulses
- restoring force could be tension, pressure, etc.
- Characterised by
  - wavelength ($\lambda$) or angular wavenumber ($k$)
  - period ($T$) or frequency ($f$) or ang. freq. ($\omega$)
- Speed of wave pattern is $v = f\lambda = \omega/k$

§15.3
Speed and wavelength

• Sound consists of longitudinal waves in air. At 20° C, $v = 344 \text{ ms}^{-1}$. What is the wavelength for middle C ($f = 262 \text{ Hz}$)?

Next lecture

The wave equation

Read §15.3–15.4