

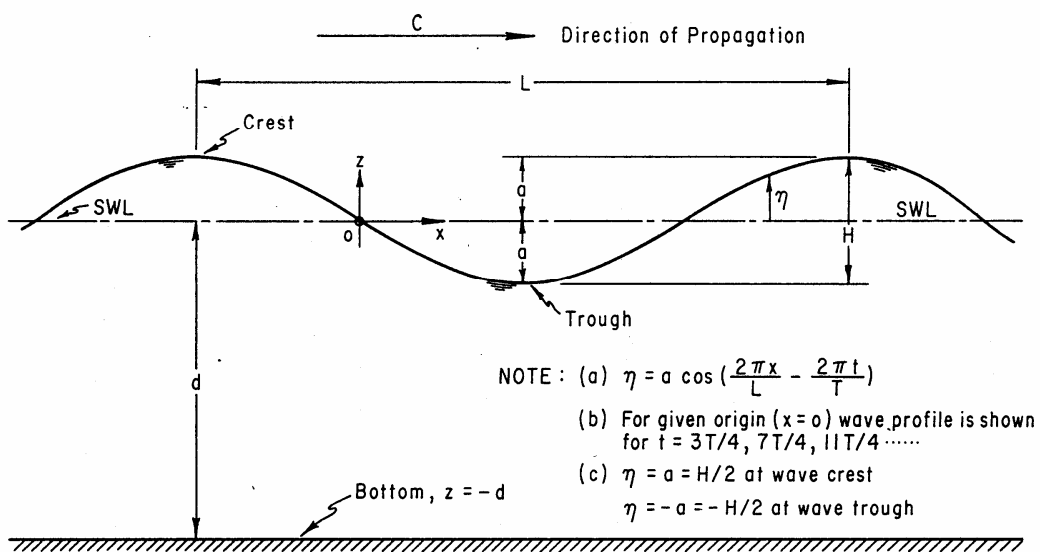
Chapter 1. Introduction

1.1 Generation of waves

- wind → wind waves (cf. gravity waves ← restoring force = gravity)
- sun, moon → astronomical tides
(cf. meteorological tide = storm surge due to low pressure and wind setup)
- underwater earthquake → tsunamis

1.2 Terminology

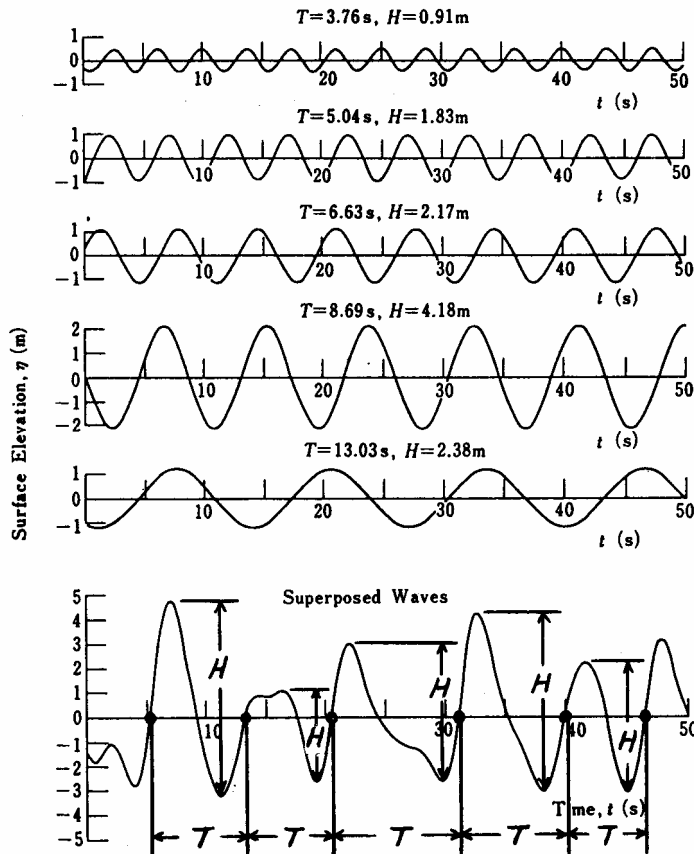
- 규칙파 (regular, sinusoidal or monochromatic waves)



- 불규칙파 (irregular or random waves)



superposition of many sinusoidal waves with different frequency, direction and phase (see Fig. 1.3: only two sinusoidal waves)



– zero-crossing method:

- (1) 파고를 가장 큰 것부터 순서대로 배열 (H_1, H_2, \dots, H_N)
- (2) 유의파고 (significant wave height) = 파의 전체 개수(N 개)중 가장 큰 것부터 1/3의 파고를 평균한 값:

$$H_s = H_{1/3} = \frac{1}{N/3} \sum_{i=1}^{N/3} H_i ; \quad T_s = T_{H_{1/3}} = ?$$

$$H_{1/10} = \frac{1}{N/10} \sum_{i=1}^{N/10} H_i$$

$$H_{\max} = H_{1/N} = (1.6 - 2.0)H_s$$

$$\bar{H} = H_1 = \frac{1}{N} \sum_{i=1}^N H_i$$

(3) 자승평균평방근 파고 (root-mean-squared or rms wave height):

$$H_{rms} = \sqrt{\frac{1}{N} \sum_{i=1}^N H_i^2}$$

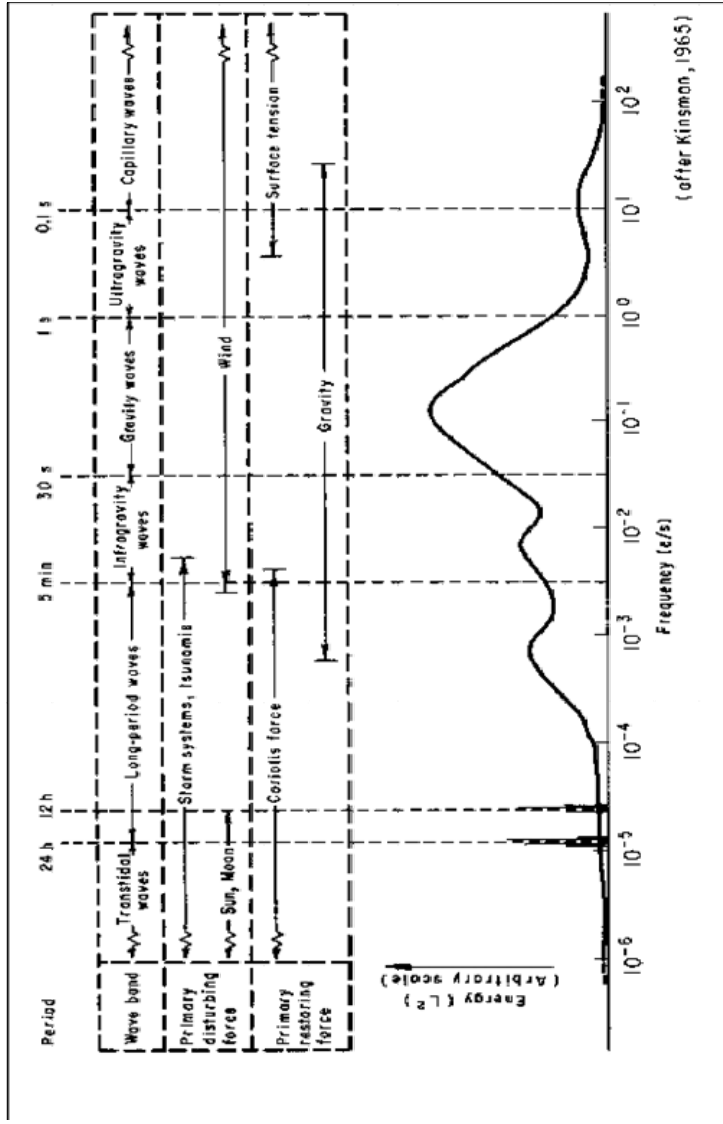
$$H_{1/3} \cong \sqrt{2} H_{rms}$$

$$H_{1/10} \cong 1.27 H_{1/3} = 1.8 H_{rms}$$

$$H_{max} \cong 1.8 H_{1/3} = 2.6 H_{rms}$$

$$E = \frac{1}{8} \rho g \frac{1}{N} \sum_{i=1}^N H_i^2 = \frac{1}{8} \rho g H_{rms}^2 \quad \leftarrow \quad E = \frac{1}{8} \rho g H^2 \quad \text{for regular waves}$$

- Classification of waves



(after Kinsman, 1965)