1.3.33-00 Phase velocity of rope waves

What you can learn about ...

- ➔ Wavelength
- ➔ Phase velocity
- ➔ Group velocity
- ➔ Wave equation
- ➔ Harmonic wave

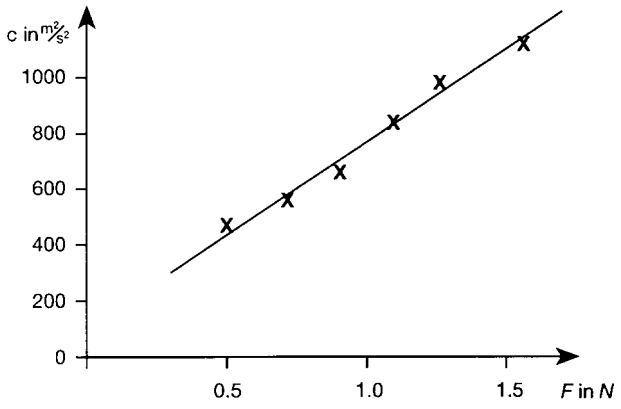
Principle:

A quadrangular rubber rope is inserted through the demonstration motor and a linear polarised fixed wave is generated. With the help of a stroboscope, the frequency and the wave length are determined. Then the phase velocity of rope waves with a fixed tensile stress is ascertained. Subsequently, the mathematical relationship between the phase velocity of the rope and the tensile on the rope is examined.

What you need:

Grooved wheel, after Hoffmann	02860.00	1
Square section rubber strip, l = 10 m	03989.00	1
Laboratory motor, 220 V AC	11030.93	1
Gearing 10/1, for 11030.93	11028.00	1
Cotton cord, l = 10m	02091.00	1
Support base -PASS-	02005.55	1
Support rod -PASS-, square, l = 250 mm	02025.55	1
Support rod -PASS-, square, l = 1000 mm	02028.55	1
Right angle clamp -PASS-	02040.55	3
Rod with hook	02051.00	2
Pulley, fixed, on rod, dia. 65 mm	02260.00	1
Spring balance 10 N	03060.03	1
Bench clamp, -PASS-	02010.00	1
Silk thread, 200 m	02412.00	1
Measuring tape, l = 2 m	09936.00	1
Digital stroboscope	21809.93	1

Complete Equipment Set, Manual on CD-ROM included
Phase velocity of rope waves P2133300



The square of phase velocity depending upon the force F applied on the rope.

Tasks:

1. With constant tensile stress, the frequency f, which depends on the wavelength λ of the wave that propagates itself along the rope. The frequency is plotted as a function of 1/λ. From this graph, the phase velocity c is determined.
2. The phase velocity c of the rope waves, which depends on the tensile stress on the rope is to be measured. The quadrant of the phase velocity is plotted as a function of tensile stress.