PHYWE Systeme GmbH & Co. KG
Robert-Bosch-Breite 10
D-37079 Göttingen

Telefon +49 (0) 551 604-0
Fax +49 (0) 551 604-107
E-mail info@phywe.de

Operating instrutions

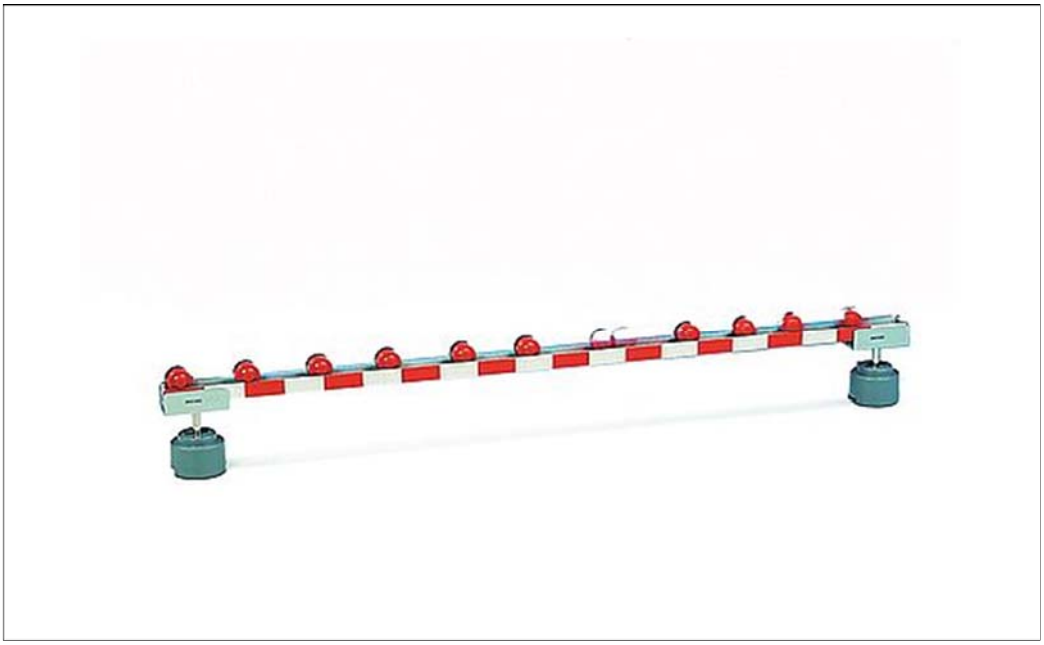

Abb. 1: Magnetic rollers apparatus 11065-00

TABLE OF CONTENTS

1 SAEFTY PRECAUTIONS

2 PURPOSE AND CHARACTERISTICS

3 HANDLING

4 EXPERIMENTS

5 TECHNICAL DATA

6 ACCESSORIES

7 NOTES ON THE GUARANTEE

8 WASTE DISPOSAL

1 SAEFTY PRECAUTIONS

Caution!

- Carefully read these operating instructions before operating this instrument. This is necessary to avoid damage to it, as well as for user-safety.
- Do not start up this instrument in case of visible signs of damage to it.
- Only use the instrument for the purpose for which it was designed.

2 PURPOSE AND CHARACTERISTICS

Model experiments showing the propagation of longitudinal waves and the characteristics of elastic collisions can be carried out with the device.
The device consists of 12 rollers and a 1m long, U-shaped track which has division markings on each side.
Each magnetic roller consists of a cylindrical magnet (d = 28 mm, l = 6mm), magnetized in the axial direction, enclosed in plastic with roller rims and colored pole identification. End bolts on the track prevent the rollers running off.

3 HANDLING

General construction: The track is set up level and clamped in two holders which are in turn supported by barrel bases. The rollers are arranged on the track such that their magnetic moments are orientated in the same direction (repulsion).

Magnetic walls: Magnetic walls provide an elastic reflection of approaching rollers.
To form a magnetic wall at the end of the track, just place a roller adjacent to the end bolt.
For a magnetic wall in the centre of the track: Place two rollers with antiparallel magnetic moments next to one another or position the track between the legs of a powerful horseshoe magnet.
Setting a roller in motion: This can be easily done manually, but the rollers should be rolled rather than pushed to reduce wear on the rolling rims. Other methods of setting in motion: Bring a horseshoe magnet in the vicinity of the roller to be started or bring a second roller near a roller which is held, for example at the end of the track and then released.

Important: To avoid reducing the magnetic strength of the rollers, they should not be allowed to fall from bench height onto a hard floor.

4 EXPERIMENTS

Longitudinal waves: To demonstrate this, all the rollers are distributed equidistantly along the track with a roller at each end of the track. When a roller is set in motion, a propagated wave can be observed in the disturbance of the rollers with the wave being reflected at the end rollers. Although the wave is damped, up to three oscillating runs can be observed.
Elastic collision against a wall: Multiple reflections can be observed within a shortened roller track bounded by two magnetic walls.
Central elastic collision: A roller which is set in motion collides with a stationary one; the interchange of momentum can be observed.
Impact propagation: A roller which is set in motion collides with a chain of 3-5 stationary rollers separated from one another by a distance of 10-15cm. The impact is propagated in the chain and the last roller moves away from the chain.

5 TECHNICAL DATA

- Length of profile: 1 m
- Colour subdivision in 5 cm segments
- Diameter of Magnetic roller: 30 mm

6 ACCESSORIES

• Barrel base (2x)	02004-00
• Plate holder, 2...35 mm (2x)	06509-00
• **Replacement:** Magnetic roller	11065-01

7 NOTES ON THE GUARANTEE

We guarantee the instrument supplied by us for a period of 24 months within the EU, or for 12 months outside of the EU. Excepted from the guarantee are damages that result from disregarding the Operating Instructions, from improper handling of the instrument or from natural wear.
The manufacturer can only be held responsible for the function and technical safety characteristics of the instrument, when maintenance, repairs and alterations to the instrument are only carried out by the manufacturer or by personnel who have been explicitly authorized by him to do so.

8 WASTE DISPOSAL

The packaging consists predominately of environmentally compatible materials that can be passed on for disposal by the local recycling service.

Should you no longer require this product, do not dispose of it with the household refuse.
Please return it to the address below for proper waste disposal.

PHYWE Systeme GmbH & Co. KG
Abteilung Kundendienst (Customer Service)
Robert-Bosch-Breite 10
D-37079 Göttingen

Phone +49 (0) 551 604-274
Fax +49 (0) 551 604-246