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Laboratory Investigations on Horizontal Interlaced Multi-layer Moored Floating Pipe Breakwaters

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Horizontal Interlaced Multi-layer Moored Floating Pipe Breakwaters are used as a means of protecting the harbor areas in ports and also to prevent erosion of vulnerable coasts. The wave attenuation characteristics of these breakwaters depend upon the type of mooring, number of layers of interlaced pipes (n), spacing of pipes (s), wave period (T), Wave height (H), diameter of the pipe (D), water depth (d) and relative breakwater width (W/L), where W is the breakwater width and L is the wavelength. The relative breakwater width (W/L) greatly influences the transmission coefficient (K_t) compared to other parameters. Earlier studies on similar floating breakwaters reveal that to achieve a transmission coefficient (K_t) less than 0.5, the (W/L) ratio should necessarily be greater than 0.4 for most of the configurations of the breakwaters.

The present paper discusses the results of the laboratory investigations conducted on Horizontal Interlaced Multi-layer Moored Floating Pipe Breakwaters with four layers of pipes (n=4) of diameter D=32 mm at a spacing of s=16 cm c/c in both x and y directions in a depth of d=50 cm. The wave heights were varied from H=3 to 18 cm and the wave periods used ranged from 1.2 to 2.2 seconds. The regular wave flume available in the Department of Applied Mechanics and Hydraulics, NITK, Surathkal was used to conduct the experiments. It was found that wave attenuations of up to 43% can be easily achieved by these pipe breakwaters. The paper also presents the review of the literature available in the area of floating breakwaters.

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