An experiment on cross-waves

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Visual observations are made of the cross-waves around a horizontal circular cylinder which is half-submerged in still water and made to oscillate vertically. The wavelength and the wave amplitude are determined for the cross-wave modes n=5 and n=6. In general, the wavelength in the vicinity of the cylinder ends is smaller than that in the central part of the cylinder. At a fixed forcing frequency, the cross-wave mode and the wavelength vary with the forcing amplitude. The cross-wave is stable at small forcing amplitudes, but its amplitude is modulated periodically or irregularly at large forcing amplitudes. When the cross-wave is in a state of periodic amplitude-modulation, the cross-wave mode and the wavelength vary periodically.

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