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Effects of Peakedness of Bimodal Waves on Overtopping of Sloping Seawalls

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Abstract : Prediction of wave overtopping is an essential component of coastal seawall designing and management. Not only that excessive overtopping is reported for impermeable seawalls under bimodal waves, but overtopping is also showing a high sensitivity to the peakedness of the random wave propagation patterns. In the present study, we present a comprehensive analysis of the effects of peakedness of bimodal wave patterns of the overtopping of sloping seawalls. An energy-conserved bimodal spectrum with four different spectra peak periods and swell percentages was applied to estimate wave overtopping in both numerical and experimental flumes. Results of incident surface elevations and bimodal spectra were accurately captured across the flume domain using sets of well-positioned resistant-type wave gauges. Peakedness characteristics of the wave patterns were extracted to derive a relationship between the non-dimensional overtopping and the peakedness across the wave groups in the wave series. The full paper will briefly describe the development of the spectrum and present a comprehensive results analysis leading to the derivation of the relationship between dimensionless overtopping and peakedness of bimodal waves.

Keywords : wave overtopping, peakedness, bimodal waves, swell percentages
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