

عنوان مقاله:

Extracting empirical factor of wave parameters based on filed data recorded under storm condition

محل انتشار:

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نویسندگان:

Alireza Jafari - PhD Candidate Griffith

Nick Cartwright - Assistant Professor Griffith

Peter Nielsen - Professor University of Queensland

خلاصه مقاله:

Understanding of storm wave behavior is critical to the development of appropriate coastal hydrodynamic models to assess risk management and mitigation strategies in response to problems such as coastal inundation and erosion. This is becoming increasingly important in the present age of accelerated global warming where it is expected that there will be an increase in the intensity of severe weather events such as tropical cyclones. One of the main problems associated with the prediction of storm waves, is the lack of availability of field data for calibrating and verifying models. Most of the existing models have been validated based on laboratory data and as such are not entirely representative of storm wave conditions experienced in the field. So far numerous investigators have tried to extract empirical relationships from recorded data which form the basis of many different wave transformation models (eg., Nairn (1990); Raubenheimer et al. (1996); Sallenger and Holman (1985); Thornton and Guza (1983); Vincent (1985)). One of the most well-known parameters is the ratio of wave height to water depth which is represented as γ . However, most of the field data analyzed has been obtained in mild to moderate wave conditions. For example, Thornton and Guza (1983), measured wave heights at Torrey Beach, California, where the beach profile is low sloped and approximately planar. The wave heights and the average peak frequency of the spectra varied between 0.6m to 1.6m and in the vicinity of 0.07 Hz respectively. The γ values obtained were about 0.6. Further work by Sallenger and Holman (1985) found that γ is dependent on the beach slope which values ranged from about 0.4 to 0.8, but independent of the offshore wave steepness. These data were collected during storm, $1.96 < H_o < 2.4$; $6.9 < T_p < 16.8$ at Duck, North Carolina. However, Nairn (1990) suggested that γ increases with increasing offshore wave steepness. He combined low and high wave steepness data collected on barred and unbarred beaches in the laboratory and field. The data used by Nairn (1990) were collected during hurricane Eloise on the Florida coast. H_{rms} and peak period vary between 1m to 2.6m and 6s to 14s respectively. To the knowledge of the authors, the only known field data set collected during storm conditions are those of Vincent (1985) in which significant wave height reaches 5m in 36m depth buoy. Based on his observations he suggests that the significant wave height was proportional to $h^{1/2}$ ($\gamma_s \propto h^{1/2}$) in the outer surf zone but γ_s was approximately constant in the inner surf zone. However, Vincent

کلمات کلیدی:

Storm Surge, Tropical cyclones, Monometer Tubes, Wave Setup

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