

EXTREME RESPONSE ANALYSES OF MARLIN TLP TENDON TENSION DURING HURRICANE IVAN

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ABSTRACT

In order to verify design factors of Marlin TLP related to extreme tension response, a statistical study on the tension data recorded during Hurricane Ivan is conducted. We discuss the effect of the bandwidth and nonstationarity on the extreme tension estimate and conclude that the direct application of the Weibull method overestimates the extreme tension. Then, a normalization method is proposed to minimize the effect of nonstationarity. We apply this method to both stationary and non-stationary simulated data to show its robustness and effectiveness.

We then apply this method to recorded tension data to calculate the observed peak factors¹ (PF) during each time interval. Finally, the peak factor distributions (histograms) are calculated and compared with those of Gaussian processes. The study results are also compared with design factors.

KEY WORDS: TLP; tension; peak factor; Weibull; Ivan; nonstationarity; bandwidth.

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