Pitch de-trending in the statistical extrapolation of ultimate blade loads

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Aim

reliable ultimate loads for the design of WEA

Way

statistic-based extrapolation methods

Focus

design values independent from the choice of wind seeds

Problem

especially blade sensors are sensitive to active pitch angle

leads to high variance in design values

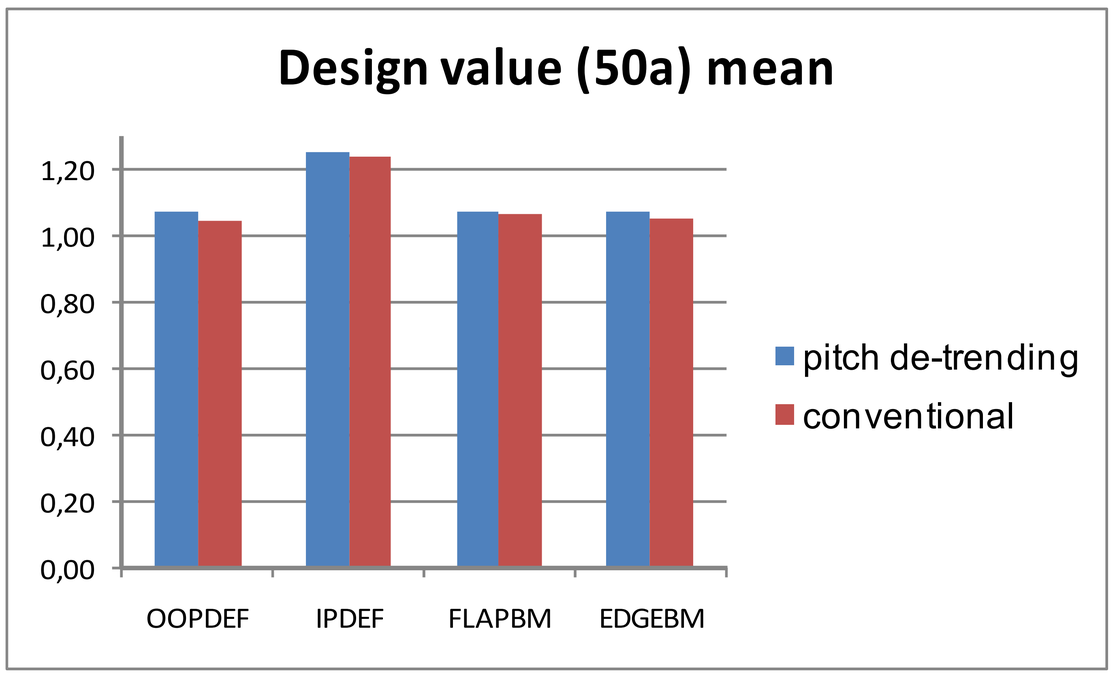
Solution

use of pitch de-trending to artificially enlarge the data set

use of observed pitch frequencies to include pitch dependence in the long term distribution

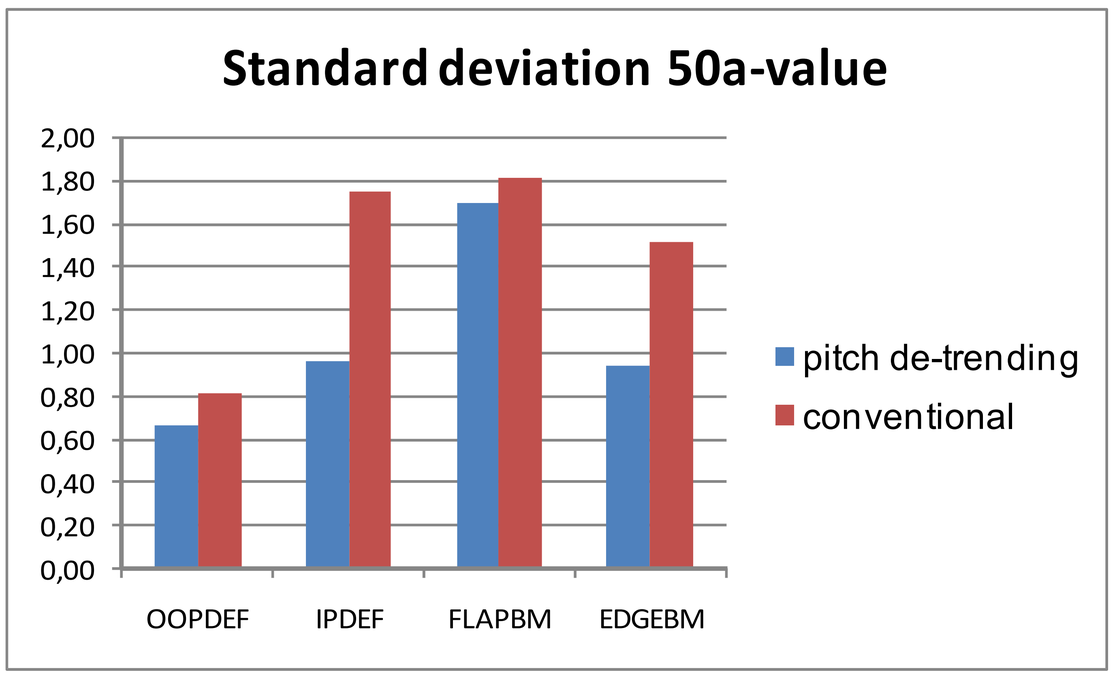
Setup for the Figures

25 realizations of 20 seeds per wind bin
normalized to observed maxima
(mean resp. standard deviation)



1. Result

mean design value stays nearly the same for all blade sensors



2. Result

standard deviation considerably reduced for in-plane deflection and edge bending moment

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