풍력발전에 적합한 기본풍속 연구

*김 정환, 정 호성, 김 형준, 한 정헌, 박 선규, **최 진웅

Study on Basic Wind Speed Suiteable for Wind Power Development

*JungHwan Kim, HoSeong Jeong, HyeongJun Kim, JungHun Han, SunKyu Park, **JinWoong Choi

The wind farm where the wind velocity condition is excellent and economical can be established to produce power with the multiple wind power turbine. The wind velocity which is suitable to Wind Power Development must be evaluated for searching the economical wind farm on planning the wind farm. In this paper, based on wind speed data at 24 locations in Korea from 1971 through 2009, the basic wind velocity which can be applied to designing wind power development is estimated using the statiscal process. The wind velocity which is measured from observation stations is revised according to wind gauge's height and Circumferential environment. The wind speeds for 200 year's return period in 24 locations are determined using the Gumbel's distribution.

본 연구는 U-city 석박사과정 지원사업의 연구비지원에 의하여 연구되었음.

Key words : Wind Power Development(풍력발전), Wind Turbine(풍력터빈), Wind Farm(풍력단지), Gumbel's distribution (Gumbel's 적률법)

E-mail : *akdang84@naver.com, **cjw85@skku.edu

3MW 해상풍력발전기 주물품의 내구수명 평가

*,**노 기태, 강 원형, 이 승찬

Assessment of casting parts fatigue life for 3MW offshore wind turbine

*,**Gitae Roh, Wonhyoung Kang, Seongchan Lee

The purpose of this study is fatigue damage assessment for large sized casting parts (hub and mainframe) of the 3MW offshore wind turbine by computer simulation. Hub and mainframe durability assessment is necessary because wind turbine have to guarantee for 20 years. Fatigue life evaluation must be considered all of fatigue load conditions as the components are wind load transmission path.

Palmgren-Miner linear damage accumulation hypothesis is applied for fatigue life estimation with stress-life approach. S-N curve for the spheroid graphite cast iron EN-GJS-400-18-LT is derived according to durability guidelines. Reduction factors were applied for survival probability, surface roughness, material quality and partial safety factor according to Germanischer Lloyd rules.

To calculate fatigue damage, stress tensors, extracted from the unity load calculation from ANSYS is multiplied with time track of fatigue loads extracted from GH bladed. Damage accumulation is performed with all of fatigue load conditions at each finite element nodes. In this study maximum nodal damage value is under 1.0. casted parts are safe.

This research was financially supported by the Ministry of Knowledge Economy(MKE), Korea Institute for Advancement of Technology(KIAT) and Honam Leading Industry Office through the Leading Industry Development for Economic Region.

Key words : fatigue damage(피로 손상), wind turbine(풍력발전기), miner's rule(마이너 법칙), S-N curve(응력수명선도)

E-mail : *,**gitae.roh@doosan.com