

Note on Engineering Details

No: DWP-FBie-extern-001

Title: „Preliminary Draft“ acc. to BSH Standard Design:
Certification requirements and extent of examination

Ref.: BSH “Standard Design of Offshore Wind Turbines”, Edition 2007
Table 2, Development Phase

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Key Words: Offshore Wind Farm, Preliminary Design, BSH, Requirements

According to BSH “Standard Design of Offshore Wind Turbines”, Edition 2007, during the development phase, submission of a preliminary design is required together with a design basis suitable to serve as basis for developing a preliminary design.

BSH recommends performing the certification process of the design basis at an early stage prior to planning of the preliminary structure (section 3.2.1 BSH-Standard).

The preliminary design is considered a technical feasibility study including different structural design variations. It enables BSH to evaluate the skills of the project developer regarding the realization of the entire wind farm project.

At GL, plausibility checks of the submitted documents will be performed, at this early project stage it is not intended to perform parallel calculations. The examination focuses on the description of the methodologies and verifications.

Following information shall be included in the documentation of the preliminary design:

1. Description of the design including
 - a. Definition of essential parameters:
 - Wind turbine type
 - Hub height (may still vary to some extent)
 - Type of support and substructure
 - Design water depth at all locations (minimum and maximum)
 - Definition of limitations of the preliminary design
 - Interfaces to other design drivers

- b. Description of the scope of the preliminary design documentation:
 - Design variants
 - Drawings, assembly drawings
 - Load assumptions
 - Limit states (stresses, buckling, fatigue, natural frequencies etc.)
- c. Description of calculation methods and boundary conditions:
 - Amendments and deviations from German standards and guidelines
 - Ultimate and fatigue loads
 - Stresses, utilization ratios
 - Buckling, stability
 - Fatigue
 - Geotechnical calculations
 - Natural frequencies
2. If not already submitted as independent document, a design basis suitable to serve for the preliminary design including site and design conditions shall be added to the preliminary design documentation. A compilation of the rules and guidelines used shall be listed.
3. Description of the load cases relevant to the preliminary design
 - a. Requirements by the turbine manufacturer regarding stiffness, natural frequencies, and maximum tower top deflection etc.
 - b. Compilation of the wind turbine loads according to the manufacturer
 - c. Preliminary loads for the support structure
 - d. Comprehensible derivation of internal forces and stresses for ULS and FLS analyses
 - e. Definition of FAT-classes or estimation of SCFs
4. Documentation of the calculation of at least one design variant
 - a. Drawing of the calculation model including loads
 - b. Plot of results (stresses, utilization ratio, etc.) including numbers. A graphical illustration alone is not sufficient.
5. Compilation of results of all analyzed design variants (estimation of global geometry)

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