

Existing wind turbines in the light of the directive “Wind Energy Facilities; Exposures and Stability Proofs for Tower and Foundation”

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The construction and operation of wind turbines is subject to public law requirements. Today the permits for new facilities usually contain covenants and conditions, which have to be proved towards the authority during the utilization time on regular intervals.

Considering this, regarding existing facilities, which were erected and are operated on the basis of building permits but also for existing facilities that have been permitted for the standard utilization time without special regulatory requirements and conditions years ago, the question of routine reviews of technical data – also for insurance reasons – turns out, in particular regarding the stability.

I. Focus

In case immission control duties are to protect third parties, in particular neighbors, these protected persons may apply or possibly sue for a subsequent order pursuant to section 17 of the German Federal Immission Control Act. As a result, even though these persons cannot influence the specific subject matters of such order, special requirements and conditions might be imposed to the wind park operator subsequently. Consideration to this must be given if the operator fails to comply with a specific norm protecting such third person, in particular section 5 para 1 no. 1 or para 3 no. 1 of the German Federal Immission Control Act (Bundes-Immissionsschutzgesetz, BImSchG). According to section 5 para 1 no. 1 BImSchG, the erection and the operating of facilities must not lead to harmful effects on the environment and other endangerments, significant disadvantages or significant nuisances to the community or the neighborhood. Section 5 para 3 no. 1 BImSchG establishes the duty to erect, to operate and to put facilities out of service in such a way so that no harmful environmental impacts and other endangerments, signifi-

cant disadvantages and significant nuisances to the community or the neighborhood may be caused.

II. State of the technology

Complying with and documenting the requirements given by the directive “Wind Energy Facilities; Exposures and Stability Proofs for Tower and Foundation” as state of the technology may ensure the proper compliance with public duties and facilitate the prove of insurance matters.

The directive “Wind Energy Facilities; Exposures and Stability Proofs for Tower and Foundation” of the German Institute for Construction Technique (Deutsches Institut für Bautechnik, DIBt) applies to the proof of the stability of the tower and the foundation of wind turbines. The DIBt is the only German approval body for construction products and types of construction. The directive contains, based on the provisions of standards of the German Institute for Standardization (Deutsches Institut für Normung, DIN), regulations on impacts on the entire wind energy system, including the associated safety factors that are basis for the determination of the force acting from the machine to the tower and the foundation. In addition, the directive comprises requirements regarding inspection and maintenance of the plant, in order to ensure the stability of the tower and its foundation. Planning, dimensioning and construction of the tower and the foundation of wind turbines are generally based on the relevant Technical Construction Regulation for comparable constructions (such as towers and masts). Since the publication of the directive “Wind Energy Facilities; Exposures and Stability Proofs for Tower and Foundation” of the DIBt in 2004 both the reference standards for the exposures and the dimensioning standards of the German Institute for Standardization have been revised or replaced by norms of Eurocode. Therefore,

the directive was revised in 2012 and adapted to the new set of standards.

III. Particulars

In essence, the directive contains provisions on the following:

- Terms and definitions (chapters 1-4)
- Exclusive use of materials that comply with the Technical Construction Regulations (chapter 5),
- Determination and consideration of loads, in particular inertial and gravitational loads, aerodynamic loads and prestressing, temperature and ice forces (chapters 7-9),
- Safety concept and evidence obligations concerning several load limits regarding the tower and its foundation (especially carrying capacity and serviceability) (chapters 10 – 13)
- Site suitability, commissioning and periodic controls (chapters 14 – 16) and
- Continued operation of wind turbines (chapter 17).

In the following some current and mentionable amendments by the directive in 2012 should be pointed out.

In chapter 5 (materials and construction) it has been codified that for the pretensioning of wind turbines only tensioning methods may be used that are approved for the pretensioning of towers. In a separate opinion, however, the DIBt admitted that a literal interpretation of this section has not to be applied until the expiration of the transition period for the wording of the directive of 2004 (in December 2014), if specific requirements are met (specific static and geometric requirements, temperature requirements as well as maintenance and inspection requirements). How to proceed after 2014 is currently not fully clarified.

In contrast to the previous directive, the regulations regarding the proof of fatigue for concrete and steel to-

wers were revised and adapted to new knowledge or the requirements regarding evidence thereon were described in detail. Similarly, the evidence requirements for proofs of the exposure temperature were determined in more detail.

The chapter regarding the foundation has been extended. Here, the European Standard for the design of geotechnical structures (Eurocode 7) was newly incorporated and tailored to the specific application for wind turbines.

In addition, the chapter "Continued Operation of Wind Turbines" has been included in the directive. It deals with principles for evaluating the safety and reliability of wind turbines in case of continued operation after the originally planned utilisation time (usually 20 years). It should be noted that the directive in so far only refers to the Guidelines for Wind Turbines, Part: Continue Operation of Wind Turbines, published by Germanischer Lloyd SE (now DNV GL). However, according to the directive of the DIBt, all inspections of the wind turbines and assessments of inspections with respect to a continued operation of a wind turbine and assessments of loads and / or components of the wind turbine must be carried out by an appropriate independent expert on wind turbines in any case.

IV. Prospects

Due to the positive economic and rapid technological development in the field of wind turbines and the increasing extensions of off-shore wind farms one has to expect further changes and amendments in the field of construction techniques in new future. An eye should be kept on further technical and legal developments imperatively.

Note

This overview is solely intended for general information purposes and may not replace legal advice on individual cases. Please contact the respective person in charge with GÖRG or respectively the author himself: Dr. Liane Thau on +49 030 884 503-187 or by email to lthau@goerg.de and Hermann Dahlitz on +49 030 884 503-130 or by email to hdahlitz@goerg.de. For further information about the author/the authors visit our website www.goerg.com.

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