Lightning Damage to Wind Turbine Blades From Wind Farms in the U.S.

This paper presents statistical data about lightning damage on wind turbine blades reported at different wind farms in the U.S. The analysis is based on 304 cases of damage due to direct lightning attachment on the blade surface. This study includes a large variety of blades with different lengths, laminate structure, and lightning protection systems. The statistics consist of the distribution of lightning damage along the blade and classify the damage by severity. In addition, the frequency of lightning damage to more than one blade of a wind turbine after a thunderstorm is assessed. The results of the analysis show that the majority of lightning damage is concentrated at the tip of the blade. Furthermore, all of the blades involved in the study show great similarity in the distribution of damage along the blade and the characteristics of the damages, even concerning the significant differences in the blades' geometry and materials.

General information
Publication status: Published
Organisations: Department of Electrical Engineering, Electric Equipment Technologies, Center for Electric Power and Energy, Global Lightning Protection Services A/S, EDP Renewables
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Number of pages: 7
Pages: 1043-1049
Publication date: 2016
Peer-reviewed: Yes

Publication information
Journal: IEEE Transactions on Power Delivery
Volume: 31
Issue number: 3
ISSN (Print): 0885-8977
Ratings:
BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 4.47 SJR 1.634 SNIP 2.519
Web of Science (2016): Impact factor 3.218
Web of Science (2016): Indexed yes
Original language: English
Keywords: Electrical and Electronic Engineering, Energy Engineering and Power Technology, Attachment distribution, lightning, lightning damage, lightning zoning, wind turbines, Damage detection, Electric utilities, Lightning, Lightning protection, Turbomachine blades, Wind power, Wind turbines, Blade Surface, Direct lightning, Laminate structures, Lightning protection systems, Statistical datas, Wind farm, Wind turbine blades, Turbine components, blades, lightning protection, power generation protection, wind power plants, blade geometry, wind turbine blades, wind farms, blade surface, laminate structure, lightning protection systems, lightning damage distribution, Blades, Delamination, Laminates, Carbon, ENGINEERING, Wind power plants, Power system protection
DOIs:
10.1109/TPWRD.2014.2370682
Source: FindIt
Source-ID: 2279785363
Research output: Contribution to journal › Journal article – Annual report year: 2016 › Research › peer-review