Analysis of electric field behaviour for wind turbine blades under the influence of various gas

Samer S. Wahdain[1], A. I. Mohamed[1], Mohd Herwan Sulaiman[1], Mohd Razali Daud[1], Raja Mohd Taufika Raja Ismail[1]
University Malaysia Pahang

ABSTRACT
Wind turbines are one of the most important natural sources of energy. The components of atmosphere gases in the surrounding wind turbines that are installed may significantly affect the increasing of electrical field resulting from lighting strikes. Here, we use the initiation and spread of electrical field in various gases O2, N2, Ar, Ne and SO2 to examine the behaviour of electrical field on blade. This study uses the Finite Element Method to investigate the influence of gases on the lightning strike carbon fibre wind turbine blade. We use 3D modelling geometry i n this study to get accurate results for all sides of the blade. The generation of an impulse wave uses three stages with time varying from 0 to 60 µs. It was observed that N2 and Air give the same reading because Nitrogen represents 72% of the air contents. Thus, our study elucidates that applying various gases can affect the electric field strength.

KEYWORDS
Lightning protection; Electric field; Wind turbine blade

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