

An Experimental Measurement Of Corona Discharge Using Laser Dopplervelocimetry

Belhadj, C.A. Shwehdi, M.H. Farag, A.S. Zedan, F.M. Klein, U.K.A.;Dept. of Electr.
Eng., King Fahd Univ. of Pet.Miner., Dhahran;

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King Fahd University of Petroleum & Minerals

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Summary

A point to plane testing discharge system was constructed allowing the flow of air to pass, circulate and return to its initial status, when corona is initiated by the alternating applied voltage on the stressed electrode. The corona wind velocity was measured by means of a laser Doppler velocimetry system implemented and calibrated in the laboratory. The velocity measurement was carried out without disturbing the field configuration intensity or the wind flow. The direction and pattern of the corona electric wind was visualized and observed through a laser curtain; this was achieved by guiding smoke to the discharge medium near the stressed electrode. Velocity measurements were obtained for various radial distances r , taken on the central discharge axis for several inter-electrode distances b . The direct observation of the obtained data shows an increase of the corona wind velocity with the applied voltage and the corona discharge current and substantial decrease as the radial distance is enlarged. An experimental investigation was conducted in the research laboratory to use electric wind corona discharge and enhance the available information supporting the corona discharge and applied voltage relationship along with the geometrical system parameters

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