

THE IMPROVED ROLLING BALL MODEL (IRBM) FOR LIGHTNING PROTECTION SYSTEM

EMECHEBE JONAS N¹, OTAVBORUO ERICSSON E², NZEAKO A. N³ & ANI C. I⁴

¹Federal Radio Corporation of Nigeria, Abuja, Nigeria

^{2,4}Department of Electronic Engineering, UNN, Nsukka, Nigeria

³Department of Electrical and Electronic Engineering, CRUTECH, Calabar, Nigeria

ABSTRACTs

This paper describes a method for improving the Rolling Ball Model (RBM) of a Lightning Protection System (LPS). The RBM applies a single vertical air terminal and a down conductor which shunt lightning current to the ground. This Model has a limitation; it could give a protection only up to 45.7m height as against the height of 100m and above for a typical radio broadcasting tower in Nigeria. The introduction of two horizontal rods to the vertical rod of the RBM improves the protection potential of the Lightning Protection System (LPS). This method is called the Improved Rolling Ball Method (IRBM). The IRBM is implemented with data from the physical specifications of the two horizontal rods, the height of the tower, the electric field strength and the rate of change of the electric field strength.

KEYWORDS: Horizontal rods, IRBM, LPS, Nigeria, RBM