

Electromagnetic Risk Management in Digital Power System

Prof. Ir. Dr.-Ing. Eko Supriyanto
Senior Consultant to PETRONAS and Head of Electromagnetic Compatibility
Laboratory,
UNIVERSITI TEKNOLOGI MALAYSIA

Keywords: *Electromagnetic Field, Digital Power System, Risk Management, Industry 4.0*

Abstract

Smart Power Plant, Digital Substation, Wireless Power Transmission System, Smart Power Meter, and Smart Grid are parts of digital power system, which have been and will be extensively implemented in the industry 4.0 era. These technologies provide excellent solution for improving efficiency and usability of digital power system. However, they are susceptible to electromagnetic disturbance. Improper electromagnetic risk management in this system may result a major business loss due to system breakdown, data stealing, unintended power control, electrical accident and fire. In order to overcome this issue, a new method for electromagnetic risk management in digital power system will be introduced. This includes electromagnetic risk identification, risk classification, risk mitigation and risk monitoring. This management shall be applied during design, construction, commissioning and operation of digital power system. Engineering document review, site observation, electromagnetic field measurement, electromagnetic field compatibility testing as well as electromagnetic field modelling and simulation need to be done in order to obtain data for electromagnetic risk management. A software called ERMA (Electromagnetic Risk Management), can be applied to assist the engineer to produce high quality risk management report. Online electromagnetic field tracker will also be introduced in order to monitor the risk in real time. This method has been implemented in new substation, new power plant, smart power meter and power transmission system in oil and gas as well as health industries. Measurement results show that most of the system is in high risk due to electromagnetic disturbance from nature source such as indirect lightning and bad weather, as well as man-made source such as walkie talkie, mobile phone, WIFI, RADAR, TV Transmitter and high power switching devices.