

Chanalai Jaroonpen 2008: A Study of Temperature Distribution inside The Neutral Grounding Resistor Cabinet of Provincial Electricity Authority of Thailand. Master of Engineering (Fire Protection Engineering), Major Field: Fire Protection Engineering, Interdisciplinary Graduate Program. Thesis Advisor: Mr.Apichart Changbamrung, Ph.D. 102 pages.

The Provincial Electricity Authority (PEA, Thailand) has been installed Neutral Grounding Resistor (NGR) at substation which located in the industrial zone for reducing voltage dip problem. There found that NGRs and devices inside the cabinet were damaged because of fire in many substations. The causing of high impedance fault or unbalance current was continuously flowing through NGR that effected to the rising of the temperature of NGRs inside the cabinet. According to the less ventilation system, temperature of air inside the cabinet was high due to heat collecting that will make some of the low voltage power cable and accessories in the cabinet were damaged by melting or deterioration of their insulation.

This research wants to study of heat rising inside the cabinet of Neutral Grounding Resistor (NGR) because of high impedance fault or unbalance current continuously fed through the earthing system via NGR. So the test was followed by 25 ampere, electric current was continuously fed to NGR in order to find out the relationship between current and temperature of NGR. After the test, we found that the temperature of NGR was 60.9°C within 1 hour after supplying 25 ampere. This result was used to set in the flow simulation model. Simulation's results found that the maximum temperature of air at the top of the cabinet was 52°C when NGR's temperature was set at 60.9°C. The maximum temperature inside cabinet will increase if the effect of radiation from the sun is added. So that will be causing the ignition of fire and the deterioration of many devices inside the NGR cabinet. In order to improve air ventilation for the NGR cabinet, the ventilation fan is suggested. From the improved model with fan, the result show that the maximum at the top cover of the cabinet was reduced enough to prevent damage of devices and NGR in the cabinet.

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Student's signature

Thesis Advisor's signature