

高电压技术

浙江省110和220 kV敞开式变电站雷害事故分析

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摘要:

对几起由雷电侵入波过电压引起的断路器损坏事故进行了仿真计算分析, 结果表明线路在受雷击跳闸后等待重合的时间内如果再次遭受雷击, 则雷电侵入波到达断开状态断路器的线路侧, 由于全反射作用使线路侧断口对地电压和断口间电压同时升高, 电压值超过断路器雷电冲击耐受水平, 从而引起断路器内绝缘或外绝缘击穿。利用电磁暂态程序(electro-magnetic transient program, EMTP)对各种措施的保护效果和最大保护距离进行了仿真计算和比较分析, 结果表明最有效的措施是在出线断路器的线路侧附近或进线段终端塔上安装避雷器。并根据变电站的具体情况给出了避雷器的安装原则、安装位置和参数要求。

关键词:

Analysis on Lightning Accidents of Circuit Breakers Installed in 110 kV and 220 kV Open Type Substations in Zhejiang Province and Prevention Measures

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Abstract:

The sequent circuit breaker (CB) damages caused by the overvoltage due to intruding lightning wave in such thunderous regions as Jiangsu province and Zhejiang province in recent years are simulated and analyzed. Simulation and analysis results show that when the tripped out line is re-stroked in the time interval, that the lightning-stroked transmission line has been tripped out and the autoreclosure is not yet finished, the intruding light surge arrives the CB at the side of the tripped out line and the voltage among the breaks and the ground at line side as well as the voltage among the breaks simultaneously rise due to the action of total reflection, and the two voltage values far exceed lightning impulse withstand voltage of CB, thus the internal or external insulation of CB will be broken down. By use of electro-magnetic transient program (EMTP), the protection effects and maximum protection distances of various protective measures are simulated and calculated, simulation and calculation results show that the most effective measure is to install lightning arrester near the outgoing line side of CB, or on the gantry or terminal tower of incoming line. According to concrete condition of substation, the installation principle and position of metal oxide arrester (MOA) as well as the requirement to parameters of MOA are given.

Keywords:

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