



某风电场220kV GIS A相套管及避雷器瓷套断裂故障原因分析

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详细信息

【标题】某风电场220kV GIS A相套管及避雷器瓷套断裂故障原因分析

【Title】Fracture failure analysis of the phase A insulating bushing and insulating bushing with 220KV GIS of a wind farm

【摘要】本文对某风电场220kV GIS（金属封闭气体绝缘组合电气设备，Gas Insulated Switch-gear, GIS）A相引出线瓷套管和A相避雷器瓷套断裂倒塌的原因进行了分析。通过查阅制造厂出厂检验报告、工艺规程和作业指导书等资料，并进行现场查勘，找到了220kV GIS A相引出线瓷套管和A相避雷器瓷套断裂的原因。分析认为220kV GIS A相引出线套管和A相避雷器瓷套的断裂原因是这两个瓷套管均存在制造质量问题，220kV GIS A相引出线套管底部法兰与瓷套结合部位喷砂有一段缺失，形成胶装部位局部应力的集中，造成电瓷材料产生微观裂纹或瓷套断裂。A相避雷器瓷套下节底座断口处水泥粘接面厚度存在较大的不均匀（粘接面厚度差值为5.05mm）。水泥粘接面厚度不均造成瓷套安装出现偏心，在瓷套根部形成了局部应力集中，在A相避雷器瓷套在GIS A相引出线套管断裂倒塌时产生的拉力作用下发生断裂。

【Abstract】This paper analyses the reasons fracture and collapse of porcelain bushings of phase A lead wires and surge arresters in a 220kV GIS (Gas Insulated Switch-gear, GIS) in a wind farm substation. By investigating the inspection, process regulations and operation instructions from the manufacturer, and conducting on-site investigations, the reasons for the fracture of the 220kV GIS A phase lead-out porcelain sleeve and the A-phase arrester porcelain sleeve were found. According to the analysis, the reason for the fracture is that the two porcelain bushings had manufacturing quality problems. Concentration of local mechanical stress at the installation site had caused microscopic cracks in the insulating ceramic material or fracture of the ceramic sleeve. There is a large uneven thickness of the cement bonding surface at the fracture of the lower section of the porcelain sleeve of the phase A arrester (the difference in the thickness of the bonding surface is 5.05mm). This causes eccentricity of the porcelain sleeve, and therefore local stress concentration is formed at the root of the porcelain sleeve. The porcelain sleeve of the A-phase arrester breaks under the tensile force generated when the GIS A-phase outlet casing breaks and collapses.

【关键词】风电场；金属封闭气体绝缘组合电气设备 (GIS)；套管；避雷器瓷套；断裂

【Keywords】wind farm； GIS (gas insulated switch-gear, GIS)； insulating bushing； insulating bushing fracture

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