中文摘要

台灣地區地下電纜逐漸普及，爲調整必 v 因數及抑制電壓，併聯電抗器之使用爲必然之結果。台電公司並聯電抗器單組容量 161kV 已規劃爲 80Mvar 並於 95 年元月在大潭電廠加入系統。並聯電抗器與斷路器組合時之啓閉操作會發生截流與再弧暫態現象，造成截流過電壓與再弧過電壓已爲大家所熟知，其中最爲嚴重的問題爲發生多重再弧時之電壓級升現象，以及再弧時之高頻電流之啓斷對斷路器接觸子之傷害。

由於首次使用 161kV、80Mvar 之並聯電抗器於台電系統中，希望對於截流過電壓與再弧過電壓有更深一層的認識，並希望藉由本文之研究探討電感電流之啓斷暫態現象對並聯電抗器用斷路器之絕緣劣化與接觸子熔損影響度，並訂定其運轉維護週期。本研究針對大潭電廠之電抗器回路進行 ATP 模擬分析，雖然分析之結果與相關文獻所得結果十分接近，但斷路器之再弧與截流現象及電源側與負載側之系統結構、參數有密切關係，實無法完全模擬，此乃現行相關之國際試驗標準中仍無法明訂的原因。由於無效電力調度需求以致並聯電抗器用斷路器操作頻繁，操作啓斷時共振之高頻再弧電流使得斷路器之接觸子在操作數百次就有可能熔損，本文中對應用於並聯電抗器之斷路器維護項目與點檢週期提出建議。

英文摘要

To compensate line capacitance current and to stabilize voltage in long distance transmission lines and cable systems, shunt reactors to be used in Taipower systems. It is known that shunt reactor current interruption causes a current chopping surge and reignition surge etc., and also it follow by high frequency arc extinction. The most important problem concerning phenomena related to the interruptions may be multiple reignition and resulting in a voltage escalation.

The 161kV, 80Mvar reactor is first used in Taipower system. Extensive studies have been pursued in much more understanding such phenomena. However, reignition high frequency phenomena are affected by the entire system structure from the power delivery side to the load side. Furthermore, actual system parameters are very complicated, and they has not been fully investigated on the high frequency model. In case of SF6 gas insulated switchgear, the decisive factors in electrical durability are contamination and wear of parts that exposed to arc, such as nozzle and contacts. Due to high operation and high frequency reignition current the electrical durability of some parts were affected severely by few hundreds operations. The extra inspection and maintenance work of the GIS applied in shunt reactor switching is needed.