

MITIGATION OF FERRORESONANCE IN POWER TRANSMISSION SYSTEM
USING STATIC SYNCHRONOUS SERIES COMPENSATOR (SSSC)

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In the name of Allah, the Most Merciful and the Most Beneficent.

“To my beloved father, mother, brother and friends, thanks for being there throughout this journey“

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ABSTRACT

Nowadays power quality becomes critical issue in power electrical system. The connection of three-phase transformer through underground cables is growing fast in residential, commercial, industrial and rural applications. Due to this increasing situation, the possibilities of having a series connected capacitance and a non-linear inductance, prone to ferroresonance, become more probable. Not only the cable capacitance (and consequently its length) is an important factor to take into consideration in the transformers ferroresonance, but also other elements are completely necessary for ferroresonance to appear. All these factors affect the ferroresonance appearance in several ways, producing the phenomenon just as well as making some damaging consequences appear. Because of that, it is necessary to have a general idea about what would be the best preventive decisions to take in order to avoid unexpected surprises. First of all it is necessary to have accurate model consist of ferroresonance then we should apply any device to smooth the sharp effect of it. In this project one of the FACTS devise has been applied, static synchronous series compensator (SSSC) to palliate ferroresonance. It is shown that the performance of system becomes better than before and maintain at its acceptable rated value.

ABSTRAK

Pada masa kini, kualiti kuasa menjadi isu kritikal dalam sistem kuasa elektrik. Sambungan pengubah tiga fasa melalui kabel bawah tanah berkembang pesat di kediaman, aplikasi komersil, industri dan luar bandar. Oleh kerana keadaan ini semakin meningkat, kemungkinan mempunyai kekuatan sambungan siri dan kearuhan bukan linear, seterusnya terdedah kepada ferroresonance, menjadi lebih tinggi. Bukan sahaja kekuatan kabel (dan seterusnya panjang) satu faktor penting untuk mengambil kira dalam ferroresonance transformer, tetapi juga unsur-unsur yang lain adalah perlu untuk ferroresonance untuk muncul. Semua faktor yang mempengaruhi penampilan ferroresonance dalam beberapa cara, menghasilkan fenomena yang sama juga membuat beberapa akibat merosakkan muncul. Oleh kerana itu, adalah perlu untuk mempunyai idea umum mengenai apa yang akan menjadi keputusan pencegahan yang terbaik untuk mengambil untuk mengelakkan kejutan yang tidak diduga. Simulasi telah dilaksanakan menggunakan perisian ATP-EMTP. Adalah perlu untuk mempunyai model ferroresonance yang tepat seterusnya menentukan peranti yang sesuai bagi menghalang atau mengurangkan kesan ferroresonance. Dalam projek ini salah satu komponen FACTS telah digunakan iaitu pemampas siri segerak statik (SSSC) untuk meredakan ferroresonance. Prestasi sistem menjadi lebih baik daripada sebelumnya dan berjaya mengekalkan tahap voltan pada nilai kadaran.