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AN APPROACH TOWARDS IMPROVISATION OF VOLTAGE UNBALANCE WITHIN A TRANSMISSION SYSTEM

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ABSTRACT:

Numerous flexible ac transmission systems are functional to transmission lines to recompense for and manage electric power. A voltage unbalance makes control error within these systems. In our work we put forward the application of a superconducting fault current limiter to get better voltage unbalance within a transmission system that is linked to a Scott transformer. A technique was introduced to decrease voltage unbalance for a thyristor-controlled series capacitor-compensated transmission line by means of a superconducting fault current limiter. A thyristor-controlled series capacitor is one of practical devices that can get better performance of flexible AC transmission systems.

Keywords: Flexible AC transmission, Voltage unbalances, Superconducting fault current limiter, Thyristor-controlled series capacitor, Scott transformer.

1. INTRODUCTION:

In the recent times, electric railway systems have gained huge concentration owing to reduction of fossil fuels and restrictions on carbon emissions to put off global warming. The usage of an electric railway causes an important load that owes to demand increase as well as performance enhancement [1]. This scheme uses a single-phase source that is supplied all the way through a Scott transformer from three-phase transmission system and has speedily varying load features in time. These features cause voltage unbalances. Power that is transmitted among a sending-end bus as well as a receiving-end bus within an AC

transmission system is based on series impedance. Impedance of a transmission line includes inductive reactance, by resistance accounting for impedance. When a series capacitor is introduced into transmission line, inductive reactance of transmission line might be compensated by means of capacitive supply. Distinctive configuration of a thyristor-controlled series capacitor from steady-state viewpoint includes a fixed capacitor by means of a thyristor controlled reactor. In our work we suggest the application of a superconducting fault current limiter to get better voltage unbalance within a transmission system that is linked to a Scott transformer. Our work proposed a technique to decrease voltage unbalance for a thyristor-controlled series capacitor-compensated transmission line by means of a superconducting fault current limiter. When a fault occurs, the proposed technique clears voltage unbalance as well as protects thyristor-controlled series capacitor therefore transmission system can rapidly return to functioning within a conventional state.

2. METHODOLOGY:

From the utility point of view, single-phase loads that cause voltage unbalances within transmission line are continually being increased. In response to unbalances, flexible AC transmission systems are functional towards control transmission system power flow and to get better system stability [2]. A thyristor-controlled series capacitor is one of practical devices that can get better performance of flexible AC transmission systems. Actual line voltage as well as current information is relatively significant thyristor-controlled series capacitor control system on the other hand, voltage as well as current unbalance produced by means of an electric railway load makes serious issues of thyristor-controlled series capacitor control. This problem can control system stability particularly; a voltage as well as current unbalances subsequent to fault will cause additional problems. Our work projected a technique to decrease voltage unbalance for a thyristor-controlled series capacitor-compensated transmission line by means of a superconducting fault current limiter. An electric railway characteristic that most of utilities are concerned by is current unbalance which is produced by huge single-phase loads and these unbalanced currents makes 3-phase voltage unbalance. To reduce voltage unbalances within 3-

phase power feed networks, Scott transformers are extensively used however, an unbalance is generated owing to huge speedily altering single-phase loads. We put forward the application of a superconducting fault current limiter to get better voltage unbalance within a transmission system that is linked to a Scott transformer. The proposed system showed the following enhancements for transmission line faults such as: fault current was decreased when compared to traditional system fault current and voltage unbalance within transmission system was speedily improved after fault was removed [3]. To limit a fault current, numerous models for superconducting fault current limiter were developed such as resistor-type, reactor-type, transformer type, and so on. In our study, we model a resistor-type superconducting fault current limiter that is mainly basic and used extensively representing experimental studies in support of superconducting elements of superconducting fault current limiter. Recovery time of superconducting fault current limiter is set to value until fault clearing to defend thyristor-controlled series capacitor as well as transmission line [4]. In our work initially configuration as well as operation of a compensated transmission line and associated electric railway system was modelled. Subsequently, voltage unbalance within transmission line was studied when line fault take place. At last, the technique for alleviating this difficulty with superconducting fault current limiter was considered.

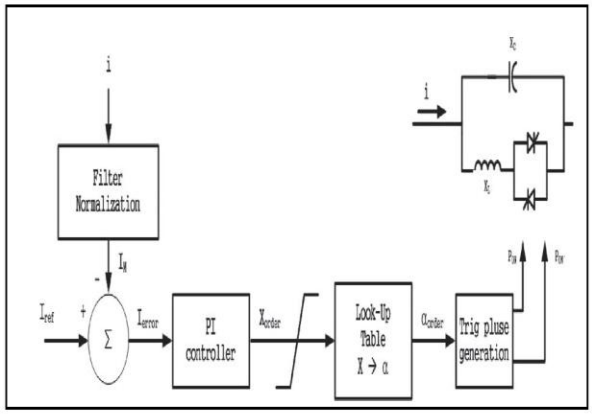

Fig1:Thyristor-controlled series capacitor closed-loop constant current control method.

3. AN OVERVIEW OF PROPOSED SYSTEM:

An unbalance is generated owing to speedily varying huge single-phase loads and subsequently unbalanced load makes an unbalanced transmission line. A voltage unbalance within source influences power equipment by means of causing a decrease in power generation ability of generator and a reduction in the output of other facilities within transmission line. We have proposed a technique to decrease voltage unbalance

for thyristor-controlled series capacitor-compensated transmission line by superconducting fault current limiter. A thyristor-controlled series capacitor can get better performance of flexible AC transmission systems. When a transmission line fault takes place, fault current is decreased by means of the superconducting fault current limiter. When fault is cleared, voltage unbalance which is produced by means of railway's single-phase loads can rapidly be reduced thus a transmission as well as electric railway system return towards steady state. Superconducting fault current limiter has benefit of speedy operation within 1/4 cycle [5]. The operation features of conventional relay as well as breaker are better than 5–15 cycles. A single-phase load within an electric railway is one of causes of voltage unbalance within transmission system on the other hand; the proposed technique by means of superconducting fault current limiter can lessen this problem. Superconducting fault current limiter was installed in transmission line among thyristor-controlled series capacitor as well as electric railway in case study simulation by means of software package. superconducting fault current limiter decreased voltage unbalance. In the transmission system that include an electric railway as well as superconducting fault current limiter, results showed fault current limiting features and development within voltage unbalance. The following features were discovered such as: the outsized resistance of resistor type superconducting fault current limiter, additional voltage unbalance was enhanced [6]. In superconducting fault current limiter operating procedure, there are dissimilarities of recovery time among superconducting elements that owes to unbalance fault current. When a fault occurs, the proposed technique clears voltage unbalance as well as protects thyristor-controlled series capacitor hence transmission system can rapidly return to functioning within a conventional state. By means of the proposed technique the following enhancements were made for transmission line faults such as: fault current was decreased when compared to traditional system fault current and voltage unbalance within transmission system was speedily improved after fault was removed. We will study a protection system by means of a superconducting fault current limiter in the future work for compensated transmission system to get better system constancy.

4. CONCLUSION:

An electric railway system that makes use of a single-phase source that is supplied all the way through a Scott transformer from three-phase transmission system. Additionally, electric railway system has speedily changing load characteristics within time. We suggest the application of a superconducting fault current limiter to get better voltage unbalance within a transmission system that is linked to a Scott transformer. Our work projected a technique to decrease voltage unbalance for a thyristor-controlled series capacitor-compensated transmission line by means of a superconducting fault current limiter. We model a resistor-type superconducting fault current limiter that is mainly basic and used extensively representing experimental studies in support of superconducting elements of superconducting fault current limiter. When a fault occurs, the proposed technique clears voltage unbalance as well as protects thyristor-controlled series capacitor hence transmission system can rapidly return to functioning within a conventional state.

REFERENCES

[1] T. Uzuka, S. Ikedo, and K. Ueda, "A static voltage fluctuation compensator for AC electric railway," in Proc. IEEE Power Electron. Spec. Conf., 2004, vol. 3, pp. 1869–1873.

[2] A. D. Del Rosso, C. A. Canizares, and V. M. Dona, "A study of TCSC controller design for power system stability improvement," IEEE Trans. Power Syst., vol. 18, no. 4, pp. 1487–1496, Nov. 2012.

[3] S. S. N. Singh and A. K. David, "Optimal location of FACTs devices for congestion management," Elect. Power Syst. Res., vol. 58, no. 2, pp. 71– 79, Jun. 2001.

[4] T.-H. Chen, "Criteria to estimate the voltage unbalances due to high-speed railway demands," IEEE Trans. Power Syst., vol. 9, no. 3, pp. 1672–1678, Aug. 1994.

[5] S.-H. Chang, K.-H. Oh, and J.-H. Kim, "Analysis of voltage unbalance in the electric railway system using two-port network model," KIEE Trans., vol. 50A, pp. 248–254, May 2001.

[6] J.-S. Kim, S.-H. Lim, J.-F. Moon, J.-C. Kim, and O.-B. Hyun, "Analysis on the protective coordination on neutral line of main transformer in power distribution substation with superconducting fault current limiter," KIEE Trans., vol. 58, no. 11, pp. 2089–2094, Nov. 2009.