International Journal of Research
Available at https://edupediapublications.org/journals
e-ISSN: 2348-6848
p-ISSN: 2348-795X
Volume 05 Issue 12
April 2018

Literature Survey on Mitigate voltage sag and swell in transmission line by using SEN Transformer

Nikhil Thombre, Sachin Chandekar, Pavan Satpute. Gaurav Raut, Pratiksha Dukare
Department Of Electrical Engineering, Jhulelal Institute Of technology, Nagpur, Maharashtra, India

ABSTRACT

Power system transmission lines are becoming more heavily loaded and this affects system security and stability. Power flow control is essential to ensure preserving lines loading security, mange the congestion of power system, alleviate line overload, and semi-equally utilize the available transmission lines as far as possible. The traditional technology of transformer and tap changer is used to implement this novel technique. A "SEN" Transformer (ST) uses transformer and tap changers that are traditionally used to build a voltage-regulating transformer. The technology of transformer and tap changer is proven to be reliable and cost-effective when compared with the emerging technology of VSC. The 'SEN Transformer' (ST) contains a number of tapped, magnetically-coupled, series transformer windings that provide independent active and reactive power flow control in a transmission line similar to a Unified UPFC. A transient model of the ST, using a hybrid transformer modeling approach is described in this paper

Keywords: "SEN" Transformer, Voltage Stability, Simulation, Power Transmission Control,FACTS.

INTRODUCTION

The demand for electrical energy around the world is continuously increasing. The locations for electric generation are based on energy availability and environmental acceptability. The transmission lines are becoming overloaded and experiencing reduced stability, increased voltage variation, and ―loop flow of power. The construction of new transmission lines is becoming increasingly difficult because of various reasons, such as unfavorable regulatory, environmental, and public policies and the escalating cost. The power industry is in constant search for the most economic way to transfer bulk power along a desired path.

Many different Flexible AC Transmission Systems (FACTS) devices have been studied in the literature in order to control the flow of power through transmission lines. The Sen Transformer (ST) proposed in the research literature [1] uses transformer technology to independently control the active and reactive power in a transmission line.

An ST, which is a single-core, three-phase transformer with a Y-connected primary winding and nine secondary windings. The ST provides two functions • voltage regulation; • impedance regulation for independent control of bidirectional active and reactive power flow compensating each phase. In this paper we suggest a new structure, as will be seen at the next page, which is capable of covering bigger areas of compensating.

ST Model: The ST is a specially designed transformer with multiple windings having multiple tap positions in the secondary. The model for such a transformer is not available in MATLAB. Therefore, nine single-phase transformers, each having on-load tap changing capability have been used to model the ST.

By using single-phase transformers, interphase. mutual flux linkage and thus mutual inductance has not been considered, which may cause some discrepancies in the results. These nine single-phase transformers are modeled with a small resistance and leakage reactance.

I. LITERATURE SURVEY

Kalyan K. .Sen, Discuss the compensating voltage is derived from the line voltage through a transformer action with the primary windings, the

exchanged real and reactive power with the line must flow through primary winding to the line.[1]

Mey Ling Sen, This paper deals with the new ST demonstrates to be the cost-effective power flow controller to meet today's utility's need of independent control of active and reactive power flow in transmission line. [2]

P. Yognanda Reddy and R. Giridhar Balkrishna are stated that ST is a unique device for controlling voltage. The advantages of the ST lie in the simplicity of its control. The absence of unnecessary complexity of power electronics, and the overall lower cost and high efficiency of the power flow controller. [3]

II. CONCLUSION

In this paper we conclude that our project literature survey has done and and it's helpful for us to make hardware of SEN transformer. The main contributions of this work are modelling of ST and its application for transmission line overload alleviation. The simulation results have proved that ST is capable of power flow control and transmission line overload alleviation. Due to its low cost, as compared to the UPFC, ST can be more widely used in power systems for power flow control. In this paper, usage of ST improved the power system security and prevented occurrence of cascade elements outage.
The ST model is currently being developed for controlling active and reactive power flows in a transmission network using MATLAB software.

III. REFERENCES

[1] K. K. Sen and M. L. Sen, ―Comparison of the sen transformer with the unified power flow controller,‖ IEEE Trans. Power Del., vol. 18, no. 4,pp. 1523–1533, Oct. 2003

[2] K. K. Sen and M. L. Sen, ―Introducing the family of "sen" transformers : A set of power flow controlling transformers,‖ IEEE Trans. Power Del.,vol. 18, no. 1, pp. 149–157, Jan. 2003.