Consequences of Switch Shunt on an Unsymmetrical Fault in Power System

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Abstract - **This paper presents to calculate the magnitude of current, voltage at the bus location of any on the unsymmetrical faults in three-phase power systems. For power system analysis in per-unit, they are on without switched shunt and with switched shunt into the bus and make Solved power-Flow fault calculation program Power World Simulator PWS-13. The results show which can see the active, reactive and appearance power factor, phase angle in a real time comparison with the solved power flow in accordance with standard IEC-909 without switched shunt in the consequence of switch shunt on an unsymmetrical fault in power system.**

Keywords – **unsymmetrical faults, solved power flow, IEC-909, switched shunt**

I. INTRODUCTION

Short circuits occur in three-phase power systems are unsymmetrical faults, which may consist of unsymmetrical short circuits, the unsymmetrical faults occur as single line-to-ground faults, line-to-line faults, double line-to-ground faults, and balanced three-phase faults [1]. The path of the fault current may have either zero impedance, which is called a *bolted* short circuit, or nonzero impedance. Other types of faults include one-conductor open and two-conductors open, which can occurs when conductors break or when one or two phases of a circuit breaker inadvertently open. When an unsymmetrical fault occurs in an otherwise balanced system, the sequence networks are interconnected only the fault location. As such the computation of fault currents is greatly simplified by the use of sequence networks besides the above controls, the power flow program can be used to investigate the consequence of switching in or out lines, transformers, loads, and generators. Proposed system changes to meet future load growth, including new transmission, new transformers, and new generation can also be investigated. Power-flow design studies are normally conducted by trial and error. Using engineering judgment, adjustments in generation levels and controls are made until the desired equipment loadings and voltage profile are obtained.

II. THEORY

Control of power flow: The following means are used to control system power flows:

1) Prime mover and excitation control of generators

2) Control of tap-changing and regulating transformers

3) Switching of shunt capacitor bank, shunt reactors, and static var systems

A simple model of generator operating under balance steady-state conditions is the Thevenin equivalent shown in figure 1. V_t is the generator terminal voltage, E_g is the excitation voltage, δ is the power angle, and X_g is the positive sequence synchronous reactance [2,3].

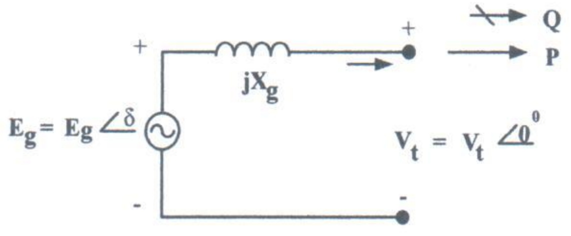

Figure 1 Generator Thevenin Equivalent