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IMPACT OF MANUAL VS AUTOMATIC TRANSFER SWITCHING ON RELIABILITY OF POWER SYSTEM

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Abstract - *The overall reliability models and analysis of power system provides an estimate of the frequency and duration of load point interruptions of the system. The duration of repairing and switching activities necessary to restore a unique and smart power system configuration to a normal operating state from an outage state has a significant impact on the power system and disturb the stability of the system. This project provide the information and discusses the significant variations in the frequency and duration of load point interruptions at an power system due to manual and automatic switching activities. Various cases studies with different open and short circuit failure modes of circuit breakers and fuses will also be presented and discussed for both manual and automatic switching restoration activities. It is expected that increasing amounts of new generation technologies will be connected to electrical power systems in the near future. Most of these technologies are smaller scale than conventional synchronous generators and are therefore connected to distribution power grids. And technologies different from the synchronous generator, such as the squirrel cage induction generator and high or low speed generators that are grid coupled through a power electronic converter. when connected in small amounts, the impact of distributed generation on power system transient stability will be in very few amount and also harmful effect on the system.*

The proposed approaches have been demonstrated on bus radial distribution systems. The obtained numerical results of the proposed approach have been compared to the various smarts techniques in the systems.

Key words: *Automatic, Reliability, Transient Stability, Simulation, Power System Dynamics.*

1. INTRODUCTION

The complexity of the modern power systems, the dependence of society upon them, and the large investment costs required has lead to quantitative reliability analysis of power systems. Quantitative evaluation and design of reliable electrical industrial power systems is important due to the high costs associated with power equipment outages and curtailed industrial processes. In this topic the zone branch methodology is used for reliability evaluation. The methodology can readily be used to evaluate the impact of restoration and switching activities and the impact of the failure of protection schemes at individual load points. A zone branch single-line diagram is drawn from a single line schematic of an industrial plant. The reliability evaluation is carried out for each load point using the direct path zone. The basic element in graphical or digital representation of an industrial power system feeder circuit is a link, i.e., a homogeneous connection between any two nodes or buses in a power system configuration. A link may be a piece of electrical equipment connecting two points in the circuit such as transformer or regulator, or a length of overhead line or cable composed of the same material over its entire length.

Protective equipment is normally installed at the beginning of a link or branch or feeder section in order to protect proceeding equipment from faults within that link or branch or feeder section. Some of the basic protective equipment used in industrial power distribution systems are fuses, recloses, section alizers, breakers and relays, and automatic and manual isolating or disconnecting switches. In order to evaluate the protection coordination and reliability characteristics of a given circuit, it is necessary to divide a circuit into protective zones. Essentially, a protective zone is a part of an industrial distribution feeder circuit that can isolate or detach itself automatically or manually from the remaining circuit if a permanent fault occurs in any of its links. Evaluation of protection equipment characteristics establishes whether the protective equipment can isolate faults in the branches of the affected circuit from the remaining circuit. The speed of isolation will dictate whether any "sensitive" equipment on the remaining circuit will be interrupted, a critical consideration for 24-hour 7-day-a-week power system operation. The concept of protective zone branches will initially be based upon the following assumptions.

All faults are permanent faults. The protective equipment perfectly isolates all permanent faults instantaneously. The protective equipment is perfectly coordinated, i.e., the device closest to the fault operates first. The protective equipment does not fail.

2. LITERATURE SURVEY

For this paper, literature survey has been studied from various sources like journal, books, article and others. Literature survey includes all important studies which have been done previously by other research work. It is importance to do the literature survey before doing the project. The review of the work as per the follows:

D. O. Koval Zone branch reliability methodology for analyzing industrial power systems. The complexity of the modern power systems, the dependence of society upon them, and the large investment costs required has lead to quantitative reliability analysis of power systems. Quantitative evaluation and design of reliable electrical industrial power systems [1].

Reza M. Slootweg, J. G. Schavemaker Investigating Impacts of Distributed Generation on Transmission System Stability the impact of DG on the power system transient stability will be negligible, however, when the penetration of DG increases, its impact is no longer restricted to the distribution network but starts to influence the whole system, including the transmission system transient stability [2].

N. Jenkins Impact of dispersed generation on power systems, the impact of distributed generation technology and penetration level on the dynamics of a test system is investigated.[3]

3. OBJECTIVE OF PAPER

The basic element in graphical or digital representation of an industrial power system feeder circuit is a link, i.e., a homogeneous connection between any two nodes or buses in a power system configuration. A link may be a piece of electrical equipment connecting two points in the circuit such as transformer or regulator, or a length of overhead line or cable composed of the same material over its entire length. Protective equipment is normally installed at the beginning of a link or branch or feeder section in order to protect proceeding equipment from faults within that link or branch or feeder section. Some of the basic protective equipment used in industrial power distribution systems are fuses, recloses, sectionalizes, breakers and relays, and automatic and manual isolating or disconnecting switches.

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3. CONCLUSION

This paper concludes and discussed the significant variations in the frequency and duration of load point interruptions at an power system due to manual and automatic switching activities. Three case studies with different percentages of OC and SC failure modes of circuit breakers and fuses were also presented and discussed.one of the difficulties in assessing reliability analysis of industrial power systems is clearly defining the equipment reliability data, load constraints and assumptions of the reliability models. If the automatic switching procedures are bumpless then sensitive loads will not be interrupted during the transfer activities. On the other hand, if the automatic switching procedures are too slow and disrupt loads within the industrial power system then the economic advantage of automation is lost.

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