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Interconnected Substation Monitoring & Controlling Using PLC,SCADA

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Abstract - *Industrial automation is an integral part of modern lives that help to monitor and control the Industrial electrical devices as well as other aspects of the Industrial that is expected to be the standard for the future Industrial. Power management and controlling is an important constraint in the design of various loads in industries for automation. So if power consumption increases then the substation monitoring is very important for the purpose of controlling the hardware and software optimization with the help of PLC ladder logic system and SCADA were used. This technique in order to reach strong conclusion about their actual impact on the power grid monitoring and control without manpower. SCADA refers to a system that enables on electricity utility to remotely monitor, co-ordinate, control and operate transmission and distribution components, equipment and real-time mode from a remote location with acquisition at date for analysis and planning from one control location. PLC on the other hand is like the brain of the system with the joint operation of the SCADA and the PLC, it is possible to control and operate the power system remotely. Task like Opening of circuit breakers, changing transformer taps and managing the load demand can be carried out efficiently.*

Key Words: **Automation, Intra-connection, Substations, Power Distribution, PLC, SCADA**

1. INTRODUCTION

For any country, development & growth is depends on the industries. All industries required continues power supply for mass production, there are major productivity losses due to power shading. In Manufacturing industries Power outages bring production lines to an abrupt halt. This may translate into loss of material, breakdown of machinery, and loss of productive time. This may also cause supply chains to shut down altogether. Consulting services firms and software development facilities house hundreds of highly paid professionals. Even a brief period of downtime leaves them stranded and results in loss of billable hours. In an age where it operations are an organization's window to the rest of the world, power outages result in crashed computer systems, lost data and abrupt termination of communications with clients. This is often followed by several weeks of effort spent in recreating hundreds of man-hours of work. Programs and data may get corrupted resulting in software recovery operations that may not be resolved for weeks.

2. SYSTEM OVERVIEW

Main power source is a GEB source. Main power supply feed the power to substation to transformer than transformer feed the supply to PLC panel and PLC panel feed the supply to MCC panel and MCC panel supply to industrial load. i.e induction motor and any device of industry and domestic appliances. When main power supply is cut of at that time PLC gives the signal to nearest substation or interconnected substation. Now power feed from another substation which are connect with faulty substation. Main supply is primary substation and as a backup supply is interconnected substation which monitoring by SCADA and controlling by PLC.

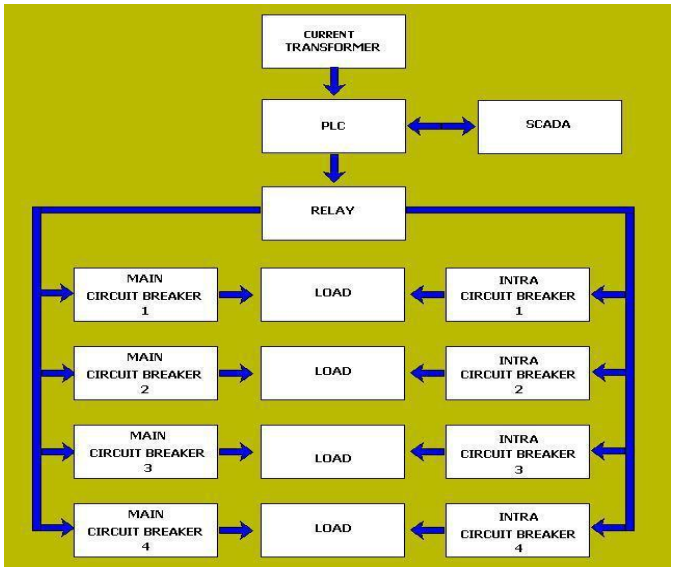

Figure-1: Block Diagram

3. SIMULATION RESULTS

The simulation model was designed using SCADA Software. All fault indicates on SCADA and provide supply from another substation manually by SCADA from Control Room.

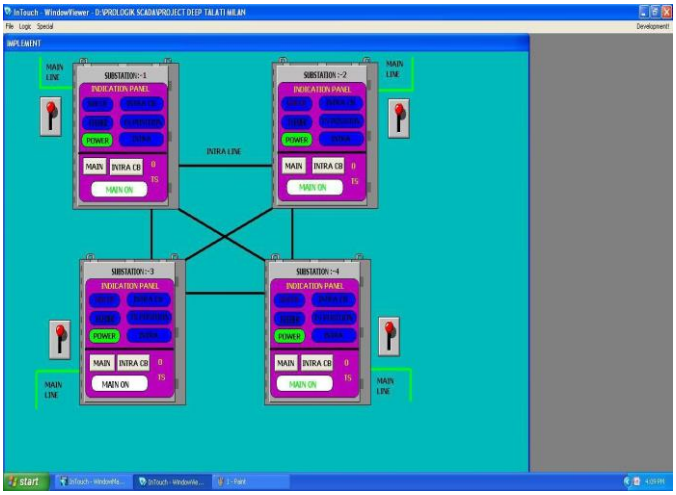

Fig 2 Shows all substations is in healthy condition and provide supply to load which are connect with each substation.

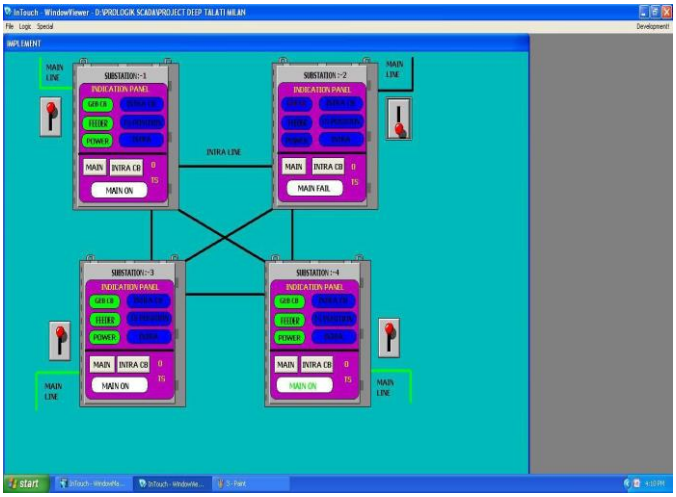

Fig 3 Shows that substation 2 facing fault like over voltage , under voltage , over load , short circuit then the output supply given by substation 2 is now interrupted and load connect with substation 2 not getting any power.

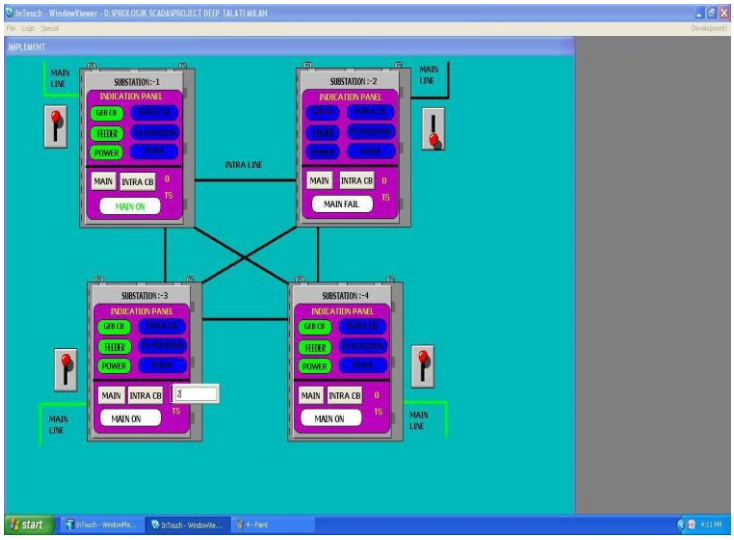

Fig 4 shows that now substation 3 provided supply to substation 2 which are interconnected. so operator start intra-connection supply between substation 2 and 3.

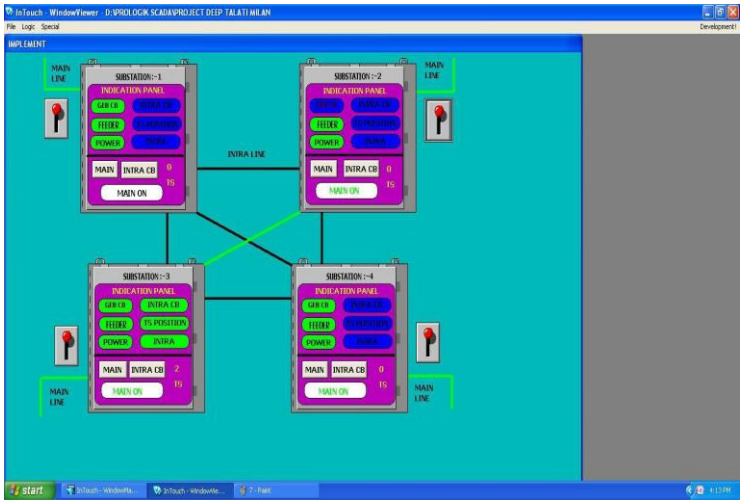

Fig 5 shows that substation 2 and 3 now inter connected and power sharing started between this substations and after getting power from substation 3 substation 2 provide power to loads which are connected at end. Now when fault is clear on substation 2 then operator disconnect intra-connection and again power provide by substation 2 to its loads.

4 RESULTS

4.1 Normal condition

PARAMETERS	REQUIRED VALUE	MEASURED VALUE
VOLTAGE	230VAC	230VAC
CURRENT	0.3A	0.3A

4.2 Abnormal condition

PARAMETERS	REQUIRED VALUE	MEASURED VALUE	ACTION
OVER VOLTAGE	230VAC	250VAC	SYATEM TRIP
UNDER VOLTAGE	230VAC	190VAC	SYATEM TRIP
OVER CURRENT	0.1A	1A	SYATEM TRIP

5 ADVANTAGES

1. Reduce man power.
2. Reduce power down time to valuable customers.
3. Less employee required to operate whole system.
4. PLC & SCADA gives remotely access of substations.
5. Controlling and monitoring of substation is easy.
6. Electrical accident reduce.

6 DISADVANTAGES

1. Interconnection require more investment.
2. Need extra switch gear panel for interconnection.
3. More space require in substation.
4. More cable , bus-bar , breaker , panel require more maintenance.
5. PLC & SCADA system are costly.

7 APPLICATIONS

1. Feeder protection.
2. Voltage and frequency monitoring.
3. Incomer protection.
4. Bus-bar short circuit protection.
5. Industrial and domestic.

8 CONCLUSION

When power goes down from grid to substation, at that time this system will operate & start intra-system automatically and feed power to particular substation as per maximum load capacity using PLC & SCADA system. Substation Intra connection will help to minimize power cut of time for valuable customer and also reduce man work.

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