CHAPTER 5

DISCUSSION AND CONCLUSIONS

5.1 Discussion

In simulation study, some of the technical methods as listed below are used:

- reduce line impedance
- rotor resistor starting
- SVC

The simulation results are in appendix A.

5.1.1. Reduced Line Impedance

From the simulation result, Figure A2 - Figure A8 represent the system using single distribution line and Figure A9 - Figure A15 represent the system using double distribution line (reduced line impedance). It is clear that when we reduce the line impedance, the voltage drop during both steady state and transient state are reduced, the induction motor power requirement is slowly increased while the reactive power requirement is instantly increase and slowly decrease. The induction motor power requirement is shown in Figure A2.1 and Figure A9.1. The induction motor reactive power requirement is shown in Figure A2.2 and Figure A9.2 .

5.1.2. Rotor Resistance Starting

From the simulation result, Figure A9 show the system using double distrbution lines with DOL starting, Figure A10 show the system using double distrbution lines with rotor resistor starting, Figure A11 show the system using double distrbution lines with double rotor resistor starting. By this method, induction motor power and reactive power requirement will instantly increased and slowly decreasing as shown in Figure A10.1 - A10.2 respectively . By this way voltage drop is reduced. Furthermore, if we increase the rotor resistance value, there will be more reduction in voltage drop. Figure A11.5 show the result of using larger rotor resistance value.

5.1.3. SVC

In this section, the various of SVC is introduced into the sytem at bus-B but every type give the result likely the same, Figure A12 - A15 show the simulation result for various type of SVC. From the simulation results, by this method, the power and reactive power consumed by an induction motor are similar to DOL starting. But at bus-B, when we start induction motor the SVC will inject reactive power into the system to compensate the reactive consumed by induction motor. Thus the reactive power level of system is rarely not change, therefore the voltage drop is reduce.

5.1.4. Voltage Comparision With PEA's Measurement

From table 5.1 and table 5.2, it is clear that if we introduce SVC into the system it can reduce the voltage drop along the line. Furthermore, from the computor simulation result, using SVC also reduce the period of transient response.

Table 5.1 Voltage Comparision With PEA's Measurement For Single Distribution line System

SYSTEM	voltage before starting(kV)	voltage during starting(kV)	voltage after starting(kV)
PEA's measurement	21.02	17.60	20.60
DOL starting	21.00	17.90	20.70
Rotor resistor starting	21.00	19.40	20.70
Rotor resistor starting(double)	21.00	20.00	20.70
SVC type 1	21.00	20.35	20.70
SVC type 2	21.00	20.35	20.70
SVC type 3	21.00	19.00	20.70
SVC type 4	21.00	19.30	20.70

Table 5.2 Voltage Comparision With PEA's Measurement For Double Distribution line System

SYSTEM	voltage before starting(kV)	voltage during starting(kV)	voltage after starting(kV)
PEA's measurement	21.20	19.30	21.00
DOL starting	21.20	19.45	21.04
Rotor resistor starting	21.20	20.10	21.04
Rotor resistor starting(double)	21.20	20.50	21.04
SVC type 1	21.20	20.70	21.04
SVC type 2	21.20	20.70	21.04
SVC type 3	21.20	20.70	21.04
SVC type 4	21.20	20.00	21.04

5.2 CONCLUSIONS

The simulational and analytical investigation carried out have emphasized some facts that can be summarized as follows:

1. The starting up of large induction motor causes the system voltage drop due to the sudden load change.
2. The voltage drop occurs because the inability of the supply to meet in step the reactive power demand of the connected load.
3. To prevent voltage drop, the electricity authority should improve its system and the consummer should improve the starting up procedure.
4. The system improvement is
   a) build the network stronger is first priority
   b) temporaly could use SVC
5. The customer contributes as a result of the contract negotiate with supplier