

DEDICATION

I dedicate this research to my **Wife**, my **Father**, my **Mother** and my
Brothers

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Abstract:

In this research it's intended to reduce the number of line trips by improving the radial feeders reliability of “KHARTOUM NORTH DISTRIBUTION AREA” 11KV radial feeders which it's tripped frequently by using three scenarios. The first scenario by installing auto reclosers & sectionalizers devices in these feeders and connect these devices with SCADA system. The second scenario by removing the uninsulated conductor wires of the all radial feeders 11 KV & changing them with insulated wires 11kv. The third scenario by changing the configuration of the overhead line radial feeders to underground cable system.

The distribution system, lines faults, autorecloser, sectionlizer and the smart feeder operation are defined. The comparison between the three scenarios is discussed with calculating the reliability indices by using matlab & GIS softwares.

المستخلص:

يهدف هذا البحث الى تقليل عدد مرات فصل المغذيات التوزيعية بتحسين اعتمادية شبكة التوزيع الكهربائية لمغذيات منطقة توزيع كهرباء الخرطوم بحري بمستوى جهد 11 ك.ف. والتي تفصل بصورة متكررة . تم استخدام ثلاثة سيناريوهات للتحسين ، بالسيناريو الاول تم ربط مفاتيح هوائية ذاتية التشغيل وفواصل هوائية في هذه المغذيات ، أما بالسيناريو الثاني تم تغيير الموصلات غير المعزولة بالمغذيات بموصلات معزولة بجهد 11 ك.ف. ، وبالسيناريو الثالث تم تغيير شكل المنظومة من شبكة هوائية الى شبكة كوابل أرضية.

تم تعريف نظام التوزيع، اعطال الخطوط ، المفاتيح الهوائية ذاتية التشغيل ، الفواصل الهوائية ، منطق العمل للمفاتيح الهوائية ذاتية التشغيل والفواصل الهوائية و تشغيل المغذيات الذكية وحساب مؤشرات الاعتمادية بواسطة برامج الـ GIS و matlab.

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List of Abbreviations:

SAIFI	System Average Interruption Frequency Index
SAIDI	System Average Interruption Duration Index
CAIDI	Customer Average Interruption Duration Index
ASIA	Average Service Availability Index
CAIFI	Customer Average Interruption Frequency Index
CTAIDI	Customer Total Average Interruption Duration Index
MIAFI	Momentary Average Interruption Frequency Index
MAIFI _E	Momentary Event Average Interruption Frequency Index
DFA	Distribution Feeder Automation
FDIR	Fault Detection, Isolation and Restoration
SCADA	Supervisory Control and Data Acquisition
AMI	ADVANCE METERING INFRASTRUCTURE
DA	Distribution Automation
TCC	time-current curve
DFA	Distribution Feeder Automation
ATS	Automatic Transfer Scheme
FLISR	Fault Location, Isolation and Service Restoration
DMS	Distribution Management System
NCA	Network Connectivity Analysis
SE	State Estimation
LFA	Load Flow Application
VVC	Voltage VAR control
LSA	Load Shed Application
LMFR	Loss Minimization via Feeder Reconfiguration
LBFR	Load Balancing via Feeder Reconfiguration
OM	Operation Monitor
DLF	Distribution Load forecasting
DTS	Dispatcher training Simulator
GIS	Geographic Information System
SEDC	Sudanese Electricity Distribution Company