

## **Abstract**

The main objective of this research work is to manage the distribution of the Electricity Network in the College of Engineering at Sudan University of Science and Technology using the Geometric Network module in ArcGIS system. This includes control and management of the load distribution, maintenance, new extensions and supporting decision making.

The primary source data is an aerial photograph covering the study area with 10 cm spatial resolution. Network data have been collected from the field. This includes transformers, supply sub-stations, distribution keys, and cables of different parts of electrical network.

To achieve the research objective, different thematic layers have been generated. These are building, vegetation and Electrical Network parts.

A digital map for the Electrical Network has been produced including underground cables. The loads for different sectors had been calculated to determine the weakness of the network and to manage maintenance and new extensions.

Geometric Network Model of the ArcGIS system was found to be useful and has potential usage in Electricity Network analysis and manage the flow directions of the electricity power in network.

## تجريد

يهدف هذا البحث الى ادارة توزيع شبكة الكهرباء بكلية الهندسة في جامعة السودان للعلوم والتكنولوجيا بواسطة وحدة الشبكة الهندسية في نظم المعلومات الجغرافية بغرض التحكم في توزيع الاحمال، إدارة الصيانة، توصيل الكهرباء للإمتدادات الجديدة ودعم اتخاذ القرار.

البيانات الأساسية لهذه الدراسة تمثلت في صورة جوية لمنطقة الدراسة بدقة مترية 10سم، وتم الحصول على بيانات شبكة الكهرباء من الحقل والتي إشتملت على بيانات المحولات، المحطات الفرعية، مفاتيح التوزيع والكوابل.

صنفت منطقة الدراسة الي عدة طبقات متضمنة المباني واجزاء شبكة الكهرباء المختلفة بإستخدام نظم المعلومات الجغرافية.

أهم مخرجات الدراسة تمثلت في إعداد خريطه لمنطقة الدراسة تمكن من تتبع كوابل شبكة الكهرباء تحت الأرضية، توفير البيانات اللازمة لإدارة الصيانة، توصيل الإمتدادات الجديدة وتحديد الضعف في الشبكة وفقا للأحمال.

وفق ماتم من عمل بحثي في هذه الدراسة إتضح أن حزمة الوظائف التي تدعم الشبكات الهندسية ضمن نظام أرك جي أي أس (Arc GIS) ذات فائدة كبيرة في التحكم و إدارة شبكات الكهرباء.

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