

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

Sudan University of Science and Technology  
College of Post Graduate Studies

**Improvement of Speed Governor System for  
Rosaries Hydropower Plant**

تحسين منظومة التحكم فى السرعة لنظام حواكم التربينات فى محطة توليد  
الروصيرص

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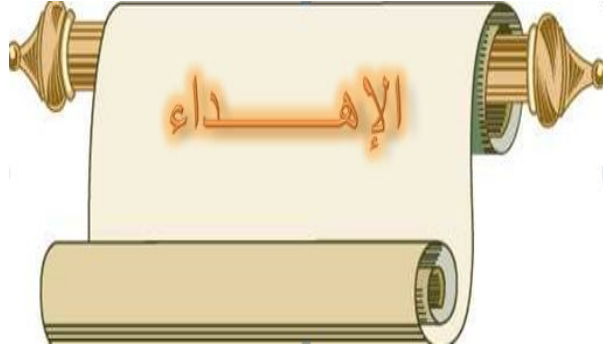
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الي التي مازالت رمزاً للصمود والتضحية

أمي

الي التي مازالت رمزاً للعطاء

زوجتي

الي جميع أساتذتي الأجلاء

الي رفقاء دربي

أصدقائي

# الشكر والعرفان



الحمد لله عدد خلقه وزنة عرشه ومداد كلماته ورضا  
نفسه

لكم نمد الحرف تقديراً ووفاءً  
لكم يجف مداد أقلامنا شكراً لعطائكم  
أتقدم بأسمى آيات الشكر والعرفان إلى أستاذنا  
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## **ABSTRACT**

Rosaries Hydro-PowerStation considered one of the primary (essential) sources for electric energy inSudan using digital governor, which increases production efficiency compare to the mechanical governors been used before.This study analyzed the hydraulic turbine, identified deficiencies from leakage oil from the pumps used, find out the amount of energy consumed, and work on reducing that by counting the loss through monitoring the poor process during period of maximum water load that exceed up to 85% . ASa result of the study it was that found theamount of the energy consumed been reduced by(48 to 63%).

Alsoreduction of the leakage of the oil in all units by using well-made efficient pumps for each unit according to its consumption.

## مستخلص

تعتبر محطة توليد لروصيرص مصدراً أساسياً للطاقة الكهربائية في السودان. وقد تم استخدام الحاكم الرقمي والذي يرفع الكفاءة والفاعلية مقارنة بأنواع الحواكم الميكانيكية التي كانت تستخدم من قبل. قامت هذه الدراسة بتحليل التوربين الهيدروليكي المعمول به وحددت أوجه القصور من تسريب الزيوت من المضخات المستخدمة ومعرفة كمية الطاقة المستهلكة عن طريقها والعمل على تقليلها وذلك بحساب الفقدان من خلال مراقبة عملية التشغيل خلال فترة الحملات القصوي والتي تتجاوز الـ 85%. اظهرت من خلالها نتائج جيدة حيث تم تقليل استهلاك الطاقة بنسبة تتراوح بين (48 الى 63%) كما تم تقليل فقودات الزيوت في الوحدات بنسب متفاوتة باستخدام مضخات جيدة الصنع والكفاءة لكل وحدة حسب استهلاكها للزيوت.

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## **LIST OF SYMBOLS AND ABBREVIATIONS**

**ABB:** ASEA Brown Bovary- Company name.

**AC:** Alternating Current.

**DCS:** Distributed Control System.

**DDC:** Distributed Computer Control.

**DEH:** Digital Electro Hydraulic.

**I&C:** Instrumentation and Control.

**KV:** Kilo Volt.

**MW:** Mega Watt.

**OMS:** Operation and Monitoring Service.

**OPC:** OLE (Object Linking and Embedding) for Process Control.

**PC:** Personal Computer.

**PI:** Proportional Integral.

**PID:** Proportional Integral Derivative.

**PLC:** Programmable Logic Controller.

**POS:** Process Operator Station.

**PU:** Per Unit.

**RCR:** Recording, Calculation and Reporting Services.

**Rpm:** Revolutions per Minute.

**SSG:** Speed Signal Generator.

**XTC:** Extended Test Controller.