



Cairo University

COMPARISON BETWEEN RO AND EDR DESALINATION SYSTEMS IN IRON FACTORY COOLING TOWERS' WATER TREATMENT

By

Ahmed Alaa El-Din Mahmoud Ali Khalil

A Thesis Submitted to the
Faculty of Engineering at Cairo University
in Partial Fulfillment of the
Requirements for the Degree of
MASTER OF SCIENCE
in
Civil Engineering - Public Works

FACULTY OF ENGINEERING, CAIRO UNIVERSITY
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Title of Thesis:

Comparison between RO and EDR desalination systems in iron factory cooling towers' water treatment

Key Words:

RO; EDR; Desalination; Cooling towers water treatment; Iron factory.

Summary:

Due to the water shortage all over the world, it becomes need to look for renewable water resources including the reuse/recycling of industrial wastewater. As such this study aims to compare between the reverse osmosis system (RO) and the reverse electro dialysis system (EDR) in the treatment of iron factory cooling towers water, in terms of quality and cost of construction based on case study in one of the iron factories in Egypt. The study includes practical comparison through actual application using a simulation model for the RO plant system carried out in Cairo, however, the EDR system practical part performed on an existing system in iron factory in Alexandria. The results show that the RO system gives better effluent water quality than EDR system. At the end of the study, the return of the investment for each system has been calculated and the results showed that the RO system is less expensive than EDR system with better return of the investment.



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عنوان الرسالة:

دراسه للمقارنه بين طريقه التناضح العكسى و طريقه الديليزة الكهربائيه العكسيه لتحليه المياه
المستخدمه فى ابراج التبريد الخاصه بمصانع الحديد

الكلمات الدالة:

التناضح العكسى، الديليزة الكهربائيه العكسيه، تحليه المياه، المياه المستخدمه فى ابراج التبريد، مصانع
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ملخص الرسالة:

نظرا لقله المياه فى جميع أنحاء العالم الان، اصبح من الضروري البحث عن مصادر جديده للمياه المتجددة بما
فى ذلك إعادة استخدام و إعادة تدوير مياه الصرف الصناعي. كما تهدف هذه الدراسة إلى المقارنة بين نظام
التناضح العكسي ونظام الديليزة الكهربائيه العكسيه فى معالجة المياه لكى تصبح صالحه لاستخدامها فى أبراج
التبريد فى مصانع الحديد من حيث جودة وتكلفة البناء بناء على دراسة حالة فى أحد مصانع الحديد فى مصر.
وتتضمن الدراسة مقارنة عملية من خلال التطبيق الفعلي باستخدام نموذج محاكاة لمحطة بنظام التناضح
العكسى تم تنفيذه فى القاهرة ، أما التطبيق للمحطة التى تعمل بنظام الديليزة الكهربائيه العكسيه أجري على نظام
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Dedication

This work took some years from my life, I wish to express special dedication to people who have suffered to educate, prepare, and help me to be the best.

To my eyes , my father , my mother and my wife

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