شبكة المعلومات الجامعية

بسم الله الرحمن الرحيم

شبكة المعلومات الجامعية

التوثيق الالكتروني والميكروفيلم

شبكة المعلومات الجامعية

جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها
علي هذه الأقراص المدمجة قد أعدت دون أية تغيرات

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تحفظ هذه الأقراص المدمجة بعيدا عن الغبار

UPGRADING WATER TREATMENT PLANTS BY USING DISSOLVED AIR FLOTATION

A Thesis
Submitted to the Faculty of Engineering
Ain Shames University for the Fulfillment
of the Requirement of M.Sc. Degree
In Civil Engineering

Prepared by

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B.Sc. in Civil Engineering, July 2014
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2019

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The M.Sc. Degree in Civil Engineering

(SANITARY & ENVIRONMENTAL ENGINEERING)

by

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Faculty of Engineering – Ain Shams Univeristy – Cairo, EGYPT

THESIS APPROVAL

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Date: - ---/--/2019

Dedication

This thesis is lovingly dedicated to all the close, special and beautiful people in my life.

A special dedication to

THE MEMORY OF MY LATE FATHER

and to

MY SUPPORTIVE MOTHER

and to

MY WONDERFUL BROTHER

and finally
special dedication to

MY LOVELY HUSBAND

For encouraging me to complete this work and for always being there for me...

Also, to

MY LOVELY DOUGHTER

May it could be her candle for future

STATEMENT

This dissertation is submitted to Ain Shams University, Faculty of Engineering for the degree of M.Sc. in Civil Engineering.

The work included in this thesis was carried out by the author in the department of Public Works, Faculty of Engineering, Ain Shams University, from February 2016 to December 2019.

No part of the thesis has been submitted for a degree or a qualification at any other University or Institution.

The candidate confirms that the work submitted is his own and that appropriate credit has been given where reference has been made to the work of others

Date: - ---/-- /2019

Signature: - ----------

Name: - ***NADEEN SAMEH AHMED SAEED MOSTAFA***

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ABSTRACT

Name *:* NADEEN SAMEH AHMED SAEED MOSTAFA

Title*:* "UPGRADING WATER TREATMENT PLANTS BY USING DISSOLVED AIR FLOTATION"

Faculty: Faculty of Engineering, Ain Shams University.

Specialty: Civil Eng., Public Works, Sanitary & Environmental Eng.

Abstract: -

Due to the rate increase for potable water need, the general project trend is the vertical expansions for water treatment plants instead of the horizontal ones. By upgrading the existing plants using new technology to reach the maximum capacity and conserve the water quality parameters as the Egyptian Code states. As the benefits of plant upgrading are no new land is needed also, low cost solution, comparing with the construction of new water treatment.

This study aims to upgrade the existing water treatment plants using dissolved air floatation system, in order to reach the maximum possible capacity using several possible scenarios without adding major civil works.

The study shows that, the scenario which involves DAF technology then sedimentation and filtration has the best removal efficiency because it has three treatment phases. The use of one treatment phase from floatation or sedimentation followed by filtration achieved lower efficiency. At last direct filtration, considering low removal efficiencies due to the high rate of filtration which allowed the suspended solids to escape.

For the application upon Al Ameriyah water treatment plant, the first proposal with five combined tanks, two tube settler and one filter tank is the most convenient proposal to be achieved. Since it has high technical evaluation with the least estimated cost 85,769,200 LE. The use of DAF technology combined with sedimentation gives the chance to increase the existing plant capacity from 520000 m^3/day to 864815 m^3/day with percent increase equals 66.31% which is a convenient technical and financial solution.

KEY WORDS

Water Treatment, Dissolved air flotation, Combined tank, Application on Al Ameriyah, Technical and financial evaluation.

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