



# **BLENDING PROCESS FOR SLUDGE THICKENING**

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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**The M.Sc. Degree in Civil Engineering**  
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by  
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Date: - ---/--/2014

# Dedication

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

*A special dedication to*

My supportive parents

*And to*

My dear

Sister and Grandmother

*And finally*

*Special dedication to*

My wife

*Thank you for encouraging me to complete this work and for always  
being there for me.*

## 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 October 2012 to May 2014.

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: - ---/-- /2014

Signature: - -----

Name: - *AHMAD MOHAMED ALI AHMAD FERGALA*

## **ACKNOWLEDGMENTS**

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*It is with immense gratitude that I acknowledge the support and help of **Professor Dr. Mohamed El Hossieny El Nadi**, Professor of Sanitary & Environmental Engineering Faculty of Engineering, Ain Shams University, this thesis wouldn't have been possible unless his great efforts, meticulous revision, scientific guidance and tremendous support.*

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## **ABSTRACT**

**Name :** AHMAD MOHAMED ALI AHMAD FERGALA

**Title:** "BLENDING PROCESS FOR SLUDGE THICKENING"

**Faculty:** Faculty of Engineering, Ain Shams University.

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

**Abstract:-**

The objective of this thesis is to study the blending process as a method for increasing the efficiency of the gravity thickener. The problem is that in Egypt in many wastewater treatment plants the gravity thickener efficiency is lower than expected, the solids outlet is lower than expected especially when the primary and secondary sludge are mixed together. In this thesis, the blending method using dilution water (effluent water from Al Gabal Al Asfar wastewater treatment plant) before thickening to increase the efficiency of the gravity thickener was studied.

The thesis shows that the blending by addition of dilution water to the mixed sludge is not suitable for the sludge produced in this wastewater treatment plant.

In addition; the results shows that there is no increase in the thickening efficiency with the addition of the dilution water.

The thesis studied three different mixing ratios between the primary and secondary sludge 2:8, 4:6 and 3:7 (the actual ratio in the WWTP) and found that the ratio 4:6 gives the best thickening efficiency.

The results explained that it is not suitable to increase the retention time in the gravity thickener when the primary and secondary sludge are mixed together and when the dilution water is added to them.

## **SUPERVISORS**

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**Assistant Prof. Dr. Sayed Ismail Ali Ahmed.**

## **KEY WORDS**

**Wastewater Treatment, Sludge Treatment, Gravity Thickener.**

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