



بسم الله الرحمن الرحيم

∞∞∞∞

تم رفع هذه الرسالة بواسطة / مني مغربي أحمد

بقسم التوثيق الإلكتروني بمركز الشبكات وتكنولوجيا المعلومات دون أدنى

مسئولية عن محتوى هذه الرسالة.

ملاحظات: لا يوجد





**AIN SHAMS UNIVERSITY**  
**FACULTY OF ENGINEERING**  
**Department of Structural Engineering**

# **Enhancement of Ultra High Performance Concrete Using Glass Waste Products as an Alternative to Cement and Fine Aggregate**

A Thesis submitted in partial fulfilment of the requirements of the degree of  
Master of Science In Civil Engineering  
(Structural Engineering)

Submitted by

**Mennat Allah Mohamed Mohamed**

BSc in Civil Engineering – Structural Engineering (2016)

Faculty of Engineering, Ain Shams University

Supervised by

**Prof. Dr. Mohamed A. Khalaf**

Professor of Properties and Testing of Materials  
Structural Engineering Department  
Ain Shams University

**Dr. Amr Maher EL Nemr**

Associate Professor  
Structural Engineering Department  
German University in Cairo

**Dr. Fareed Mahmoud Elgabbas**

Assistant Professor  
Structural Engineering Department  
Ain Shams University

**April - 2022**





Ain Shams University  
Faculty of Engineering  
Department of Structural Engineering

Name : Mennat Allah Mohamed Mohamed Mohamed  
Enhancement of Ultra High Performance Concrete Using  
Thesis : Glass Waste Products as an Alternative to Cement and Fine  
Aggregate  
Degree : Master of Science in Civil Engineering (Structural)

**EXAMINERS COMMITTEE**

Name and Affiliation	Signature
<b>Prof. Dr. Mohamed Khafaga</b> Professor of Structural engineering Housing and building National Research Center  <b>Prof. Dr. El Sayed Abdel Raof</b> Professor of Structural engineering Department of Structural Engineering Faculty of Engineering, Ain Shams University  <b>Prof. Dr. Mohamed A. Khalaf</b> Professor of Structural engineering Department of Structural Engineering Faculty of Engineering, Ain Shams University	
<b>Date:     /     / 2022</b>	





Ain Shams University  
Faculty of Engineering  
Department of Structural Engineering

Name : Mennat Allah Mohamed Mohamed Mohamed  
Thesis : Enhancement of Ultra High Performance Concrete Using Glass  
Waste Products as an Alternative to Cement and Fine Aggregate

Degree : Master of Science in Civil Engineering (Structural)

**SUPERVISORS COMMITTEE**

Name and Affiliation	Signature
<b>Prof. Dr. Mohamed A. Khalaf</b> Professor of Structural engineering Department of Structural Engineering Faculty of Engineering Ain Shams University	
<b>Dr. Amr Maher El-Nemr</b> Associate Professor, Material Engineering Department, Faculty of Engineering, German University in Cairo	
<b>Dr. Fareed Elgabbas</b> Assistant Professor, Structural Engineering Department, Faculty of Engineering, Ain Shams University	

Date: / / 2022

Postgraduate Studies

Authorization stamp: The thesis is authorized at / / 2022

College Board approval  
/ / 2022

University Board approval  
/ / 2022



# STATEMENT

---

A This thesis is submitted as a partial fulfilment of Master of Science in Civil Engineering (Structural Engineering), Faculty of Engineering, Ain shams University.

The author carried out the work included in this thesis, and no part of it has been submitted for a degree or a qualification at any other scientific entity.

**Name:** Mennat Allah Mohamed Mohamed

**Signature:**

**Date:**





## **RESEARCHER DATA**

---

Name : Mennat Allah Mohamed Mohamed

Date of birth : 24 March 1993

Place of birth : Cairo, Egypt

Last academic degree : B.Sc. in Civil Engineering

Field of specialization : Structural Engineering

University issued the degree : Faculty of Engineering, Ain Shams University

Date of issued degree : June 2016

Current job : Design Engineer



## ACKNOWLEDGEMENTS

---

Firstly, I want to show my gratitude to **ALLAH**, for giving me the patience and the effort to complete my work.

It was a great pleasure and honor to work under supervision of **Dr. Mohamed A. Khalaf**, Professor of Properties and Testing of Materials, Structural Engineering Department, Faculty of Engineering, Ain Shams University.

Words are not enough to express my thanks for **Dr. Fareed Elgabbas**, (Assistant Professor, Structural Engineering Department, Faculty of Engineering, Ain Shams University) and **Dr. Amr El-Nemr**, (Associate Professor, Structural Engineering Department, Faculty of Engineering, German University in Cairo), I really appreciate their patience and continuous support. I would like to thank them for their concentrated effort to finalize our work in a tight time frame and also to thank them for the technical knowledge they gave to me as they guided me how to organize my work, how to express my ideas and how to create professional output.

I would like to thank **Dr. Hamada Shokry and Dr. Maged Ezzat El Fakhrany**, Researchers in Civil Engineering Department, National Research Centre, they helped me a lot.

Also, I'm really thankful for **Eng. Hesham Fawzy**, Building System & Industry Head-Management Team member, Sika, Egypt. I really appreciate his critical support to my research. I would like to thank him for the technical knowledge I gain from him. All my gratitude for his valuable time devoted to my research.

Moreover, I appreciate **Eng. Abd El-Salam** efforts and support, he helped me a lot and provided me a lot of materials that I needed in my research. He also facilitated many struggles to me.

Needless to mention the support I got from my **Dad, Mum, Husband and Brother**. I am the luckiest person on earth to have such a great family, they helped



and supported me from day one. So, I would like to dedicate the successfulness of my research with my wonderful family. They helped me in my research from day one, so I dedicate this success to them. They encouraged me to improve my personal and technical skills. I am very grateful for them.

Thank you.

