

# الاية

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صدق الله العظيم

سورة طه - الآية (114)

## **Dedication**

I dedicate this work with sincere regards and gratitude to my Father, Mother, my wife, for their support in bringing out this study.

Tarig

## **ACKNOWLEDGMENT**

I would like to express my sincere appreciation to my supervisor Prof. Abdelrahman Elzubair Mohamed, for his help and guidance in the preparation and development of this work. The constant encouragement, support and inspiration offered were fundamental to the completion of this research.

Special thanks to Eng. Sir Alkhatim Awad Salih general manager of al yaraa engineering company, for their continuous support.

I would like to express my deep thanks for my friends for their assistance during the work of the research.

Finally, I would like to thank everyone who gave advice or assistance that contributed to complete this research.

My special appreciation goes to my wife and my parents, whose love and care have brought me to this level. Their substantial encouragements and support have helped me to succeed in finishing my M.Sc program.

## ***ABSTRACT***

In this study concrete mixes were investigated to study the effect of (Gum Arabic) on fresh and hardened concrete for trying to produce a self-compacting concrete (SCC). Results for trial concrete mixes were analyzed using the European guidelines for self-compacting concrete. The mixes were as follows:

- Mix (M0) without additive as a reference mix.
- Mix (M1) with 0.5% Super Plasticizer (SP901) as additive.
- Mix (M2) with 0.2% gum Arabic liquid plus 0.5% Super plasticizer (SP901) as additive.
- Mix (M3) with 0.6% Gum Arabic liquid plus 1.0 % Super plasticizer (SP901) as additive.
- Mix (M4) with 1.2% gum Arabic liquid plus 1.5% super plasticizer as additive.

The study shows that the four mixes M0, M1, M2 and M3 do not fulfill the requirements of the SCC mixes. In addition, the values of slump flows increased with the increasing of the dosage of super plasticizer and gum Arabic liquid. Mix M4 satisfies the requirements of SCC mixes, the use of super plasticizer and gum Arabic liquid as additive to concrete mixes may result in SCC. The value of compressive strength decreased slightly, when the increasing the value of gum Arabic liquid and SP dosage for M3, M4.

Thus it is concluded from this study that there is possibility of the use of Gum Arabic in liquid state as local additive in the concrete mixes to produce self-compacting concrete provided that another additive that increases or stops the decrease in strength.

## المستخلص

هذه الدراسة تم فيها إجراء اختبارات لخلطات خرسانية لدراسة أثر الصمغ العربي ومعرفة فعاليته على الخرسانة الطازجة والمتصلدة لمحاولة إنتاج خرسانه ذاتية الدمك.

تم تحليل نتائج الخلطات الخرسانية لدراسة استيفائها لمطلوبات المواصفات الأوربية للخرسانة ذاتية الدمك، وهي كما يلي:

\* الخلطة الأولى: (M0) بدون إضافات لخلطة الخرسانة.

\* الخلطة الثانية: (M1) بإضافة 0.5% الملدنات الفائقة لخلطة الخرسانة.

\* الخلطة الثالثة: (M2) بإضافة 0.5% الملدنات الفائقة و 0.2% من الصمغ العربي السائل لخلطة الخرسانة

\* الخلطة الرابعة: (M3) بإضافة 1.0% الملدنات الفائقة و 0.6% من الصمغ العربي السائل لخلطة الخرسانة.

\* الخلطة الخامسة: (M4) بإضافة 1.5% الملدنات الفائقة و 1.2% الصمغ العربي السائل لخلطة الخرسانة.

أظهرت نتائج الدراسة أن الخلطات (M0، M1، M2، و M3) لا تتطابق مع المواصفات الأوربية للخرسانة ذاتية الدمك، كما ان الهبوط يزيد بزيادة جرعة الصمغ العربي السائلة والملدنات الفائقة. كما أظهرت الدراسة بالنسبة للخلطة (M4) انها خلطه خرسانه ذاتية الدمك. وذلك مؤشر الى ان استخدام الصمغ العربي والملدنات الفائقة يمكن ان يعطي نتائج خرسانه ذاتية الدمك. كما أظهرت الدراسة بالنسبة للخلطتين (M3، M4) ان مقاومة الضغط تقل ببطء بزيادة جرعة الصمغ العربي السائلة والملدنات الفائقة.

أستخلص من هذه الدراسة أن الصمغ العربي في حالته السائلة يمكن أن يستخدم كمضاف محلي لإنتاج خرسانه ذاتية الدمك، مع توفير مضاف اخر للحد من النقصان في المقاومة.

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## List of symbols

ACI	American Concrete Institute
ASTM	American Society for Testing and Materials
BS EN	British European Standards
EFNARC	European Federation of National Trade Associations Representing Producer and Applicator of Specialist Concrete product
G.A.L	Gum Arabic liquid
RILEM	Reunion Internationale des Laboratoires et Experts des Matériaux, Systèmes de Construction et Ouvrages (French: International Union of Laboratories and Experts in Construction Materials, Systems, and Structures)
SCC	Self-Compacting Concrete
SP	Super plasticizer
VMA	Viscosity Modifying Agent