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ABSTRACT

This research aims to study the effect of retempering of concrete using an over dosage of superplasticizer on concrete properties.

This study includes five chapters summarized as follows:

Chapter one:

- Introduction.
- History of using admixtures in concrete.

Chapter Two:

- It includes literature review.
- Classification of admixtures.
- The effect of retempering using different types of admixtures on concrete.
- Concrete plants.

Chapter Three:

- Properties of used materials.
- Experimental program and tests.
- Studied variables that include: retempering time (0.0, 30, and 60 min), chemical admixtures used in concrete mix (0.0, Type G, and mix of Type G and F), retempering admixture (Type G, Type F, third generation of Type F& and Type C) cement types (OPC and SRC) and cement content (250, 300, 350, 400, and 460 Kg + 40 Kg silica fume).

Chapter four:

- Test results and discussion: it includes, slump, setting time, cube compressive strength, splitting tensile strength, modulus of elasticity, and durability indices results.

Chapter Five:

- The following conclusions are among the conclusions observed:
 1. The use of a mix of Type G and Type F as an initial admixture enhances initial slump compared with the use of Type G.
 2. The use of an admixture based on naphthalene decreases slump loss compared with that based on melamine.
 3. Concrete containing sulfate resisting cement ($C_3A = 1.22$ and $SO_3 = 2.17$), having a maximum recommended dosage of used Type G (1.5%), and retempered using 1.5 % of Type G, leads to the following conclusions:
 - It increases initial setting time from 6.66 to 60 hours.
 - It yields a negligible (zero) one day compressive strength.
 - It decreases 3, 7, 28 and 90 days compressive strength by 99%, 64.70%, 31%, and 31% respectively.
 - It decreases 90 days splitting tensile strength and 90 days modulus of elasticity by 2.0 and 23.2% respectively.
 - It slightly decreases 90 days absorption.
 4. Concrete containing 400 kg/m^3 sulfate resisting cement, having a maximum dosage of 1.5% of used Type G, and retempered using 1.5 % of Type F based on melamine (compared with retempering using 1.5% G), leads to the following conclusions:
 - It decreases initial setting time from 60 to 12.83 hour.
 - It increases one days compressive strength from 0.0 to 6.6 N/mm^2 .
 - It increases 3, 7, 28 and 90 days compressive strength by 154 times, 2.23 times, 72.7%, and 75% respectively.
 - It enhances tensile strength and modulus of elasticity by 60.8% and 50.8% respectively.
 - It decreases absorption by 2.4%.
 - So it's recommended to retemper sulfate resisting concrete having maximum dosage of Type G, using Type F specially based on melamine.

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