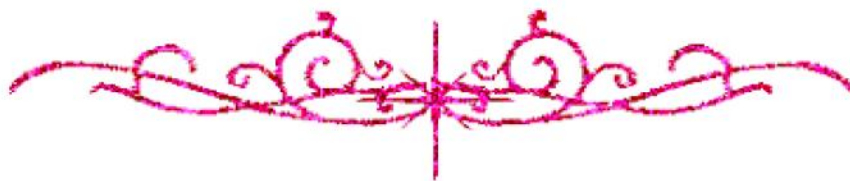


بسم الله الرحمن الرحيم





شبكة المعلومات الجامعية التوثيق الالكتروني والميكروفيلم



جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

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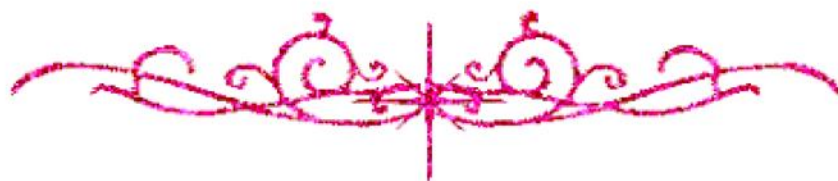


بعض الوثائق الأصلية تالفة





بالرسالة صفحات
لم ترد بالأصل





**Ain Shams University
Faculty of Engineering
Structural Engineering Department**

Behavior of Concrete Slabs Reinforced with Basalt Fiber Bars

A THESIS

**Submitted in partial fulfillment of the requirement for
the degree of Master of Science**

By

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**The examine committee considers a thesis satisfactory and accepted for the
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STATEMENT

This thesis is submitted to Ain Shams University, Cairo, Egypt, in partial fulfillment of the requirements for the degree of Master of Science in Civil Engineering (Structural).

The work included in this thesis was carried out by the author at reinforced concrete lab of the faculty of engineering, Mataria, Helwan University.

No part of this thesis has been submitted for a degree or qualification at any other university or institute.

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ABSTRACT

This thesis presents an experimental and investigation on the behavior of concrete slabs reinforced with basalt fiber bars. This research focused on the application of the BFRP-bars as reinforcement of concrete slabs. The polypropylene fibers were also added to the concrete mix to improve the behavior of the slabs. The experimental program was done at the Materials Testing Laboratory of the Faculty of Engineering Mataria, Helwan University, Cairo by using most of the materials available in the Egyptian market. Using imported BFRP-bars with diameters of 12 mm with a length of 2000 mm.

The experimental program examined the impact of different parameters on the behavior of the concrete slabs. These parameters were:

1. Bars type: Steel, and Basalt fibers.
2. Three reinforcement percentages: (0.57%, 0.75%, 0.94% respectively).
3. Quantity of polypropylene fibers: (0, 1.5 and 2kg/m³) added to concrete.
4. Compressive strength of the concrete: (250, 300, 350 kg/cm²).

The key test results demonstrated that the specimens, reinforced with BFRP-bars, had higher deflection and strain than it of the specimen reinforced with steel and consequently it had lower stiffness. The cracking and ultimate load of the specimens reinforced with BFRP-bars was lower than it of the specimen reinforced with steel.

On the other hand, adding the polypropylene fibers had a great effect on the mechanical characteristics of the concrete mix as it led to narrower and more uniformly distributed cracks, reduce the deflection and strain of the specimen, reinforced with BFRP-bars, by 51% and 61% respectively and increasing the ultimate load of these sample to 99% of the ultimate load of Steel Sample.

Finally, we can overcome the problem of the steel corrosion and saving high costs of periodic maintenance at cost increase of 60% only.

Keywords: BFRP-bars, RC slabs; reinforcement ratio; polypropylene fibers; Compressive strength of concrete. Compressive strength of the concrete;

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