The Evaluation of Changes in Concrete Properties Due to Fabric Formwork

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ABSTRACT

Fabric as a flexible formwork for concrete is an alternative giving builders, engineers, and architects the ability to form virtually any shape. This technique produces a superb concrete surface quality which requires no further touch up or finishing. Woven polyolefin fabrics are recommended for this application. A permeable woven fabric allows excess water from the concrete mix to bleed through the mold wall, and therefore reduce the water-cement ratio of the concrete mix. Due to the reduction in water-cement ratio, higher compressive strength in fabric formed concrete may be achieved, as also suggested by earlier research. The current research study was conducted to investigate and document the changes in concrete strength and overall quality due to use of commercially available woven polyolefin fabrics. Use of fabric formwork will contribute to decreased construction cost, construction waste, and greenhouse gas emissions. Two sets of tests were conducted as a part of this research study including comparison of compressive strength of fabric formed versus PVC formed concrete cylinders and comparison of behaviour of the fabric formed reinforced columns versus cardboard formed reinforced concrete columns. Variables in this research were limited to two types of fabric with different permeability (Geotex 104F and Geotex 315ST) and two types of concrete; concrete made with conventional Portland cement and no flyash herein called normal concrete (NC) and concrete with 30 percent flyash in its mix design (FAC).

The laboratory results revealed that fabric Geotex 315ST is an ideal geotextile for forming concrete. It was also found that the effects of fabric formwork on concrete quality in a large member are limited mostly to the surface zone and the core of the concrete remains the same as a conventionally formed concrete. Even though fabric formed cylinder tests showed an average of 15% increase in compressive strength of the concrete samples, compressive strength of the reinforced columns did not dramatically change when compared to the companion cardboard formed control columns. This research confirmed that fabric formwork is structurally safe alternative for forming reinforced concrete columns.

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External Links

The Centre for Architectural Structures and Technology (C.A.S.T.)



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Last update: **2023/10/18 21:33**