

“A review study & recommendation on Bendable Concrete”

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Abstract

The Concrete material used for construction due to its advantage over other material such as its mold-ability to desire shape and economical as construction material over other material. But due to inability of resistance to tension it fail to fulfill the requirement of some critical situation. So to overcome the lacuna of concrete and improve the flexibility property of concrete it is require to add some additional material. So, the concrete mix with addition with additional material to improve the tensile strength is a Engineered Composite Material abbreviated as ECC and also called as bendable concrete. The bendable concrete material has promise for solving some of the deck durability problems we face, such as premature cracking. We're hoping the ECC will work well, and possibly lower the cost when experience is gained on large scale production. The work by ECC for any structure which has experienced three winters of freezing and thawing cycles, has much better crack control than the normal concrete. The ECC path with sensors to monitor the performance of the material as it is exposed to environmental load. The newly constructed Mihara Bridge in Hokkaido, Japan, has a 5 cm ultra-thin deck of ECC which is expected to open to traffic after short period. The bridge is 40 percent lighter than traditional concrete, and has an expected service life of 100 years.

In this study, the experimental investigation is used to evaluate the behavior of concrete exposed to thermal condition and finding out the most suitable design for ECC to withstand all exposure condition. It is useful to make concrete which can be used at very sever condition.

1. Introduction

ECC technology has been used already on projects in Japan, Korea, Switzerland and Australia, but has had relatively slow adoption in other place. That's despite traditional concrete's many problems: lack of durability and sustainability; failure under severe loading; and the resulting expenses of repair. ECC addresses most of those problems that comes in the conventional. The ductile, or bendable, concrete is made mainly of the same ingredients in regular concrete absence of the coarse aggregate. It looks exactly like regular concrete, but under excessive strain, the ECC concrete gives because the specially coated network of fibers veining the cement is allowed to slide within the cement, thus avoiding the in flexibility that causes brittleness and breakage. Fiber-reinforced concrete is old concept in construction material but ECC under development for the past 10 years is vastly superior to other fiber-reinforced concretes in development today. In addition to reinforcing the concrete with micro scale fibers that act as ligaments to bond the concrete more tightly, scientists design the ingredients in the concrete itself to make it more flexible by showing in figure 1 Test on Bendable concrete. An expansion joint is a section with interlocking steel teeth that lets the concrete deck move as a result of temperature variations, but major problems occur when joints

jam frequently, and scientists expect significant savings by using ECC.

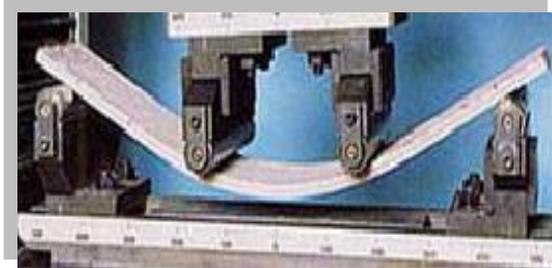


Fig. 1 Bending Test

1.1 Current Problem in concreting

a. Corrosion problem

Reinforcing steel corrosion is the most common cause of failure of concrete structures. Once started, rebar corrosion cannot be stopped by simply waterproofing the surface of the concrete. Steel corrosion in reinforced concrete structures has been a major problem across world today. Steel-reinforced concrete structures are continually subject to attack by corrosion brought on by naturally occurring environmental conditions such as carbonation and the introduction of chlorides from sources such as salt water, deicing salts, and accelerating admixtures. A combination of the product with other protective systems is required if the level of durability of the concrete structure needs to more than double.

b. Shrinkage Reducing Admixture for Concrete

