Transparent Concrete - A New Innovation in Concrete Technology

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Abstract

The concrete currently used in the construction industry generally consists of at least cement, water and aggregates (fine or coarse). As is well known, traditional concrete has a greyish colour, and its high density prevents the passage of light through it, which means that it is also impossible to distinguish bodies, colours and shapes through it. As can be imagined, concrete with the characteristic of being transparent will permit a better interaction between the construction and its environment, thereby creating ambiences that are better and more naturally lit, at the same time as significantly reducing the expenses of laying and maintenance of the concrete. Another additional feature is its pleasing aesthetics that can change the image of the concrete which is generally perceived as dull, pale, opaque grey material. This paper describes the types of optical fibre , Manufacturing process andb Some of the possible applications of transparent concrete to various products. It also presents Advantages and Disadvantages of transparent concrete.

Keywords:, Transparent Concrete, Environment, Construction, Optical Fibre

1. Introduction

With the economic growth and science-technology development, more and more large-scale civil engineering structures such as tall buildings, underground buildings and landmark buildings and so on are built around the world. While the economic growth is a kind of extensive growth: high input, high consumption and high pollution, for that the energy saving technology is low, especially in developing countries. The brightness of indoor environment is entirely maintained by artificial lighting, which has consumed a large number of resources. Moreover civil engineering structures always suffer from external environmental effects, economic loss and casualties are serious once damaged. And now, building energy saving and building safety have been attracted much attention. Meanwhile some new building materials are developed and used in structures, including soundproof concrete, thermal insulation concrete and so on. All these functional materials only focus on the intelligence characteristics, and cannot possess energy saving.[1] In 2001, the concept of transparent concrete is first put forward by Hungarian architect Aron Losonzi, and the first transparent concrete block is successfully produced by mixing large amount of glass fiber into concrete in 2003, named as LiTraCon. Joel S. and Sergio O.G. developed a transparent concrete material, which can allow 80% light through and only 30% of weight of common concrete. It is worth mentioning that Italian Pavilion in Shanghai Expo 2010 shows a kind of transparent concrete developed by mixing glass into concrete in 2010. While the transparent concrete mainly focuses on "transparent" and its application object is art design.

2. Material used for Transparent concrete

There are two basic materials used for making transparent concrete, one is from construction field and another from sensing field. First, concrete is one of the most important civil engineering materials with the advantages of rich raw materials, low cost and simple production process and second the optical fiber has good light guiding property which can be arrange to transmit the light and the sun light transmit according to pre-design road without light-heat, light-electrical or photochemical process, and photo elastic effect which can be used to study the stress distribution of structures. Combining the advantages of the concrete and optical fiber, developing a novel functional material called transparent concrete has an important value in the application of construction and sensing [2-6].