

عنوان مقاله:

Implementation of Impenetrable Concrete in Liquid Reservoirs

محل انتشار:

ششمین کنگره ملی مهندسی عمران (سال: 1390)

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خلاصه مقاله:

Concrete is a versatile construction material. Concretes in use today, are formulated with very specific performance characteristics in mind and include lightweight, heavyweight, non-osmotic, porous, fiber-reinforced, mass, high-performance and cellular concretes to name just a few. Each provides specific characteristics or properties for their intended use. These properties are achieved by intentional formulation and control of such variables as cement content and type, pozzolan type and content, aggregate type, admixtures used, the addition time and rate of those admixtures, as well as other, often subtle, differences. Concrete has also shown good performance as a general-purpose material for constructing non-permeable and non-osmotic structures such as fluid containers. Based on the mixture design and how it is placed, concrete can be almost impermeable. Guidelines for construction and mixture design are offered. Nevertheless, at regions of joints or discontinuities or while confronting severe situations such as long-time contact with strong acids other provisions should be considered in order to maintain the concrete impermeability. There are several means such as air-entraining, adding a synthetic fiber, a pozzolan like fly ash or silica fume, ground slag, and a superplasticizer to the concrete mixture that really help reduce the permeability of concrete. In this paper, some practical methods to make concrete structures non-osmotic or non-permeable such as taking advantage of waterstops as well as sealants are investigated. Besides, some curing methods which help maintain concrete in good position according to its osmosis condition are also discussed. The key factors affecting porosity are examined, as well as their relationship to moisture-related failures of seamless products. It is really apparent that the best way to eliminate moisture transmission problems is to prevent it by creating a concrete which has minimum shrinkage and capillary pores. This is done by carefully controlling the concrete mixture design with attention paid to minimizing total water, keeping the w/c ratio low, using PVC, expansive rubber, and metal waterstops as well field molded or performed sealants. Not only will this provide the least permeability, but it also provides the most durable concrete.

کلمات کلیدی:

Non-Osmosis, Non-Permeable, Coating, Liner, Sealant, Waterstop

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