



Evaluation of the occurrence of cracks in concrete dams

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ABSTRACT

One of the most important factors in the cracking and destruction of concrete dams is earthquake force. Typically, after the earthquake, cracks in the body of concrete dams are observed, and despite the consideration of the necessary arrangements in the design of the dam, due to the formation of tensile forces caused by the earthquake cracking occurs in concrete. If these cracks are not properly restrained, the dam will be damaged. In the present study, we investigate how cracks are created and the factors affecting its formation, how to distribute cracks, the classification of cracks formed in the concrete dams body, and the strategies for preventing or repairing cracks in concrete dams. Considering the great sensitivity and importance of the issue of cracking in concrete dams and the inappropriateness of conventional methods, there is a need for extensive studies and studies in this field. The crack range in concrete dams varies from a surface cracking to a concrete breakdown. In fact, the cracks cause openings that can cause further damage to concrete. The occurrence of cracks in concrete dams may endanger the structure of the dam. The occurrence of cracks in concrete sections and bodies of dams indicates a tension or movement that concrete cannot withstand. Therefore, concrete dams and their lateral structures should be designed to withstand the hydrostatic pressure of the reservoir water.

Keywords: Cracking, concrete dam, tension, water leakage, thermal cracking.

1. INTRODUCTION

The crack is the splitting of concrete into two or more portions, which is typically the initial sign of a concrete fault condition. Concrete under the influence of compression stresses behaves appropriately. This is due to the weakness of the stretch and the cracks formed in the dams body are tensile cracks due to the lack of concrete reinforcement in the concrete dams body [1]. Several factors affect cracking. It is very important to identify cracking factors in concrete sections and provide solutions to prevent cracking and its containment, and repair and reinforce concrete structures. Cracks, cracks caused by relative displacements or deep crack cracks can be dangerous. Such cracks are typically caused by one or more factors, such as design and implementation, regardless of the site conditions of the dam, applying excess live loads, structural displacement and reaction

The chemicals are caused by inappropriate selection of concrete mix designs or environmental impacts. In general, it can be stated that whenever the amount of stress in the concrete increases its resistance, there is a probability of crack occurrence in concrete sections [2].

2. Reasons to create a crack

One of the most important factors affecting the performance, durability and appearance of concrete is the cracking of concrete sections. This is far more important in structures that are adjacent to the water. The most important factor in reducing the useful life of a concrete dam is water leakage and the most important cause of water leakage, cracking of internal walls or external dams [3].

Therefore, attempts should be made to prevent cracking in areas exposed to high water pressure. In all stages of structural design, concrete mixing, and construction and operation of the dam, the risk of cracking should be considered. One of the factors that influence cracking during the construction of the dam is the initial temperature of the concrete, the initial speed, the dimensions and depth of the concrete layers, the insulation, the treatment of concrete, the temperature of the adjacent structures, the temperature of the air and Wind speed. Also, factors such as hydraulic loads, reservoir drainage velocity, drainage pressure, pitting, reservoir water volume, melting and freezing, ice effect, earthquake effects, thermal loads, and structural and fluid interaction problems can cause structural cracking. Damage during operation.