

Concrete NDT Comes of Age: Condition Assessment of a Concrete Spillway Crest Slab

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Abstract

Nondestructive testing (NDT) of concrete structures has always been problematic simply because of the complex nature and the heterogeneity of the material. This paper explores one of the most promising NDT methods used in today's civil and mining industry. The technique is based on the study of the reflection system of low frequency (20-50 kHz) body waves. The propagation of low frequency waves is well suited for heterogeneous materials because the waves suffer less attenuation which is typically promoted by absorption and scattering. The following paragraphs introduce the reader to the MSR Impact-Echo (MSR-IE) technique and discuss its capabilities in the framework of in situ assessment of concrete structures. This paper presents an in situ investigation performed on the crest slab of a spillway section of a concrete gravity dam. The focus of this article concentrates on the investigation of a recently performed restoration of a spillway section where unexplained surface opening cracks have formed on the top side of a spillway's concrete slab. The MSR-IE method was used to evaluate the extent of the damage caused by the surface bearing fissures. The investigation revealed that the cracks were limited to the depth of the repaired section and that some regions of the slab clearly showed signs of a debonded interface between old and new concrete layers. The results of the in situ investigation led to cost-effective repair strategy.

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