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Analytical Formulation for the Determination of Torsional Forces and Shear Stresses in Hydraulic Steel Structures from Field Experiments

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Nowadays great interest on the study of navigation steel structures has been arising. This may be the effect of catastrophic disasters that has occurred in the past due to the limited information available concerning these types of structures and the loads to which they are subjected to. This research focuses entirely in the study of miter gates structures subjected to the effects of torsional loading. A structural analysis creating a finite element model was executed to The Dalles Dam Miter Gate in Oregon after its failure. By means of this analysis a forensic study of the dam was realized for determining the causes of some major cracks and fractures in the bottom girders of the quoin block side and in the pintle. The deterioration in the extreme ends of the structure is a major issue changing its boundary conditions and causing a redistribution of forces whose components were directed to members for which that kind of loading was not considered in the design process. In order to perform an intelligent diagnosis of these types of structures an analytical formulation was developed that determines torsion forces and shear stresses in hydraulic steel structures from field experiments. Its main purpose is to provide a reliable tool for real-time monitoring of the structure and anticipate any abnormal structural behavior that may occur during its functional life. The formulation provides actual results that will avoid failure or collapse of the structure resulting in longer functional life and economical solutions for repairs and designs.

Ключевые слова:

Содержание.

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