عنوان مقاله:

Aspects of vibrations and fatigue of materials related to coherent structures of macroturbulent flows

محل انتشار:

کنفرانس بین المللی هیدرولیک سدها و سازه های رودخانه ای (سال: 1383)

تعداد صفحات اصل مقاله: 8

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خلاصه مقاله:

Macroturbulent flows in stilling basins can be analysed by their coherent structures, being necessary to determine length and time scales to get a comprehensive understanding of the phenomena involved. The peak frequencies of the main vortexes transported for the mean flow can be evaluated if the main parameters of the coherent structures are determined, making possible the determination of the Strouhal number as well as its comparison with the natural frequency of the structures submerged in the macroturbulent flow and, in this way, estimating potential problems of resonance. On the other hand, the effect of the fatigue in an eventual loss of resistance of the steel bars embedded in the concrete can be experimentally determined by means of the zero-crossing frequency. In this way, the number of times of the steel bars passing from traction to compression and vice versa can be estimated. The experimental data involving vibrations aspects are limited, in this article, to a free hydraulic jump downstream of a vertical gate with incident Froude number F1 =3, and a rectangular slab of width b and non-dimensional length a/h1 =3, where a is the length of the slab and h1 is the water depth at the inlet to the jump. As regards the analysis of fatigue, results for 3 < F1 < 6 are presented, also considering a free hydraulic jump downstream of a vertical gate.

کلمات کلیدی: