

Spillway gate design features which can cause vibration

JACK LEWIN, Independent Consultant, Richmond-upon-Thames, UK

SYNOPSIS. Gate vibration is a serious problem which can result in structural damage or restrict operation at certain gate openings. Operators are mostly unaware that a risk of gate vibration exists. In some cases vibration of a gate will occur under specific hydraulic conditions which may become manifest only years after commissioning of the installation. Even when these conditions have been identified it may not be easy to reproduce them so that they can be investigated. Apparently steady state conditions may be subject to minor hydraulic disturbances which overcome the damping forces acting on the gate and initiate an unstable motion, giving rise to oscillations of increasing magnitude. A number of design features can cause gate vibration; the paper briefly describes these and the conditions under which their effect on the discharge flow at spillway gates is critical. Gate vibration may also arise due to maintenance and servicing problems, or to degradation over time.