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CHANGES OF BED TOPOGRAPHY IN MEANDERING RIVERS AT A NECK CUTOFF INTERSECTION

Y. R. Fares
Department of Civil Engineering University of Surrey Guildford, Surrey United Kingdom

ABSTRACT
On the basis of a field survey on bottom topography changes in the meandering river Allan Water at the cutoff (lateral overflow) section, a detailed study of velocities and boundary shear stresses in an idealized rigid bed model was undertaken. The characteristics of curved channel flows, i.e. secondary circulation and superelevation at the water surface, have been included in the formulation. The effect of lateral overflow on the curved flow is formulated by a spatially varied flow equation with decreasing discharge. The analysis of results has shown that continual reductions in velocities and shear stresses occurred in the channel at the lateral overflow region. Maximum reduction of velocities and shear stresses was 18 percent and 37 percent for cases of low lateral overflows, and 58 percent and 82 percent for cases of high side overflows respectively. These reductions were attributed to the development of stagnation and separation zones at the intersection associated with strong lateral outward currents. Finally, an explanation is provided for the marked bed topography changes in the Allan Water situation. The changes in shear stress field are found to be responsible for the initiation of a longitudinal bar in the middle of the channel and a deep scour hole close to the outer bank.

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CONTACT:

Y.R. Fares
Department of Civil Engineering
University of Surrey
Guildford GU2 7XH
Surrey, U.K.

Email: y.r.fares@the-vine-freeserve.co.uk

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