1056-70-1432 **Ahmed Kaffel*** (kaffel@math.vt.edu), 1404 J university city boulevard, blacksburg, VA 24060, and **Amel Soualmia** and **Masbernat Lucien**. *Closure of a Saint Venant model for free surface flows on an open channel with cross stream variation of the bottom roughness.*

In this study we analyzed the effects of secondary flows on the transverse distribution of the depth average velocity in free surface flows above non-uniform bottom roughness. In a first preliminary step, 3D-simulations were achieved using an anisotropic algebraic Reynolds stress model to determine the wall friction and the dispersion terms present in the depth averaged momentum equation. In a second and fundamental step closure assumptions of these terms were tested to define a 2D-Saint Venant model which is solved to calculate the transverse profile of the depth-averaged velocity. This approach was applied to opened channels with periodic transverse variation of the roughness with reference to some available experimental results. This process could allow analyze of scale change problems. Keywords: 2D-Saint Venant equations; wall friction; Secondary flows ; Roughness; free surface flows; Dispersion ; Turbulence (Received September 21, 2009)