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Calibration of Hydro-Debris 2D Model (HD2DM) Near Erodible Bed

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The calibration of HD2DM by using experimental results have been make to check the model capability and the some modification or improvement can be made to enhanced model ability. A numerical model was developed using the Marker and Cell Method, which involves a Subgrid-Scale (SGS) model and the Particle Source in Cell (PSI-Cell) Method. The transportation processes of debris and air bubble were simulated in lagrangian form by introducing air bubbles and debris markers. Air bubble movement characteristics were simulated by this numerical model. The calibration involved parameters velocity and particle routing distributions near erodible bed (upstream). Overall from this study shows, the numerical results are in good agreement with the experimental result. It can be concluded that the calibration processes for velocity were successful. The virtual mass value is most important criteria should be considered. This because the virtual mass coefficient (C_M) value will affect ascending hydrodynamic force and gravity force. When the virtual mass is high it means the ascending hydrodynamic force will be high, but the gravity effect becomes low. In case of virtual mass become low, the ascending hydrodynamic force also become low but the gravity force will become high. The best fitted of C_M in HD2DM in this study was 0.35. The mean average velocity values show ranging from 3.1% to 13.5% is obtained from the velocity results of numerical compared to the experimental near the upstream. Furthermore, the particles routing distribution produced by the HD2DM for three different virtual mass coefficients (0.2, 0.35 and 0.5) cannot be concluded just referred to the particles routing distributions. Therefore, the mean average velocity of numerical compared with experimental model had to be referred.