

M.S. YALIN MEMORIAL Mini-Colloquium on Fluvial Eco-Hydraulics and Morphodynamics: new insights and challenges 28-29 November, 2013 Palermo, Italy

INVESTIGATION ON RATING CURVE VARIABILITY IN PRESENCE OF MOVABLE BED

Enio Paris¹, Pina Nicoletta De Cicco², Lorenzo Minatti³

^{1,2} Department of Civil and Environmental Engineering, University of Florence Via di S. Marta, 3 - 50139 Firenze,
e-mail: enio.paris@unifi.it, pinandc@dicea.unifi.it.

^{1,3} Centro per la Ricerca e l'Alta Formazione per la prevenzione del Rischio Idrogeologico, Via di S. Marta, 3 - 50139
Firenze, *e-mail: enio.paris@unifi.it, lminatti@dicea.unifi.it.*

In common engineering practice, rating curves can be obtained from stage measurements and/or flow simulations. Stage measuring gauges are usually installed on bridges, where flow conditions can be influenced by local geometry. The consequences on water levels and sediment transport capacity are induced by backwater flow, flow transition and morphological changes in river bed topography.

On the other hand, the simulations conducted to build a rating curve are often carried out in fixed bed conditions where the afore mentioned effects are poorly taken into account. In order to investigate rating curves variability in presence of movable bed, numerical simulations have been conducted assuming a rectangular cross section for a river reach with a local constriction, to reproduce the presence of a bridge. The simulations were conducted considering both fixed and movable bed conditions with different grain sizes for sediments.

A 1D finite volume numerical model (REMo, River Evolution Modeler) developed at the Department of Civil and Environmental Engineering of University of Florence has been employed. The model solves the 1D Shallow Water equations, coupled with the sediments continuity equation and provides an accurate modelling of shocks and abrupt transitions in flow and bedload transport conditions (Minatti L., Paris E., 2013).

Rating curves obtained from the classical fixed bed simulations are compared with the ones obtained with the mobile bed simulations in order to assess, the reliability of the classical approach in building rating curves.