Re-establishing sediment transport in the Rest Rhine: use of a scale physical model

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The Upper Rhine River has undergone significant morphological change in response to human activity (e.g. land use change, channelization, dam construction). The river's morphodynamic balance has been altered, with degradation and armouring of the bed being observed downstream of dams. To restore the river's natural dynamics and biodiversity, and also in order to achieve compliance of the EU Water Framework Directive for the basin, EDF is planning to re-establish sediment transport in the reach of the Upper Rhine river located downstream of the Kembs power plant (The so-called "Rest Rhine"). Different restoration strategies are envisaged, including modifying/removing groins on the left bank of the river to initiate bank erosion. The scale physical model of a reach selected for restoration has been built at EDF R&D-LNHE. Bank material is non-uniform and has been modelled using four uniform grain size classes: d=0.15 mm corresponding to a proportion of 40%, d=0.63 mm (20%), d=1.15 mm (20%) and d=2 mm (20%). The design and scaling of the physical model focused on the correct simulation of bank erosion and grain sorting processes, leading to a compromise in the choice of similarity laws. This presentation will introduce the physical model and also results obtained for the first test scenarios.