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Steel bar structures upholding open check dams for wood retention

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Mountain steep streams are often characterized by more and more intense phenomena of driftwood, associated with bed load and/or debris flows. In order to protect the inhabited areas from the risk related to these phenomena, whose hazard is increased by the presence of the driftwood, proper protection structures are needed.
We carried out a preliminary experimental investigation on the efficiency of steel bars positioned just upstream an open check dam in a special experimental channel (Rossi & Armanini, 2018, submitted), in the Hydraulic Laboratory of the University of Trento. This first study was conducted in idealized conditions: we adopted spherical monodispersed solid particles as sediments.
Now we are tackling a more complex condition, by adopting a mixture of natural sediments of different shapes and dimensions. The aim is to verify the effectiveness of the design criteria, previously determined, in these new conditions.
We start from some fundamental dimensionless parameter governing the phenomenon, in order to determine a rational criterion to evaluate the efficiency of the different kind of devices; in particular, we consider different dispositions of steel bars upholding the open check dam. We present the main differences between the simplified case and the case of natural sediments.