



## **Highlighting scouring threat on bioengineering riverbank protections**

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Soil bioengineering techniques for riverbank protection are Nature-based solutions that may fulfil most of natural riverbank ecological functions, and achieve a sustainable erosion control function. Despite their great potential, grey solutions as riprap and concrete structures are still often preferred by engineers. We suspect that the low number of existing design criteria and poor understanding of failure modes are the main barriers in the way of mainstreaming bioengineering techniques.

The failure risk of bioengineering bank protections is so far estimated by a single criterion based on a mean shear stress resistance. Recent works proved that higher hydraulic constraints were correlated to higher failure risk but that scattering remained high. In addition to natural variability due to the living material involved, a possible explanation of this scattering is that another process sometime triggered the failure. This process could be the scouring of protection that would also occur under high hydraulics constraints, but that would be only partially described by a proxy of mean bed shear stress.

A comprehensive study of failure modes of bioengineering bank protection have been performed based on empirical knowledge and field surveys. It highlighted that, in addition to the classical shear stress, scouring is a key failure mode of bioengineering bank protection. Small scale modellings of fascines were performed to highlight it.

This contribution will present preliminary results of small scale modelling of living fascine scouring failures and protections.