

## **EFFECT OF VEGETATION ON RIVERBANK STABILITY**

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In the past rivers were regulated and straightened, but unfortunately these measures have created many problems. The disadvantages have since been recognised and many rivers are being changed back into a more near-natural state. Their banks are stabilised by soil bioengineering methods, because natural riverbanks and floodplains are similarly lined by forests, shrubs or wetlands. Bank vegetation offers protection against riverbank failure and erosion, improves the water quality and serves recreational purposes for adjacent residents. Different methods are available for stabilising riverbanks: some protect only small spots (cuttings) or linear strips (fascines), others affect the entire river bank (brush mattress). Tests have shown that brush mattresses made of willows and fascines can resist shear stresses of up to 200 N/m<sup>2</sup> whereas other methods like live tree stumps fail much earlier. The main effect of young vegetation is that it causes a resistance to flow and thus reduces the flow velocity and the hydrodynamic force acting on the bank surface. In addition, the bank is reinforced by the roots of the plants. Tests have shown that the main failure mechanism of flexible vegetation is erosion of the soil material. Therefore, the best protection is produced by dense, flexible vegetation covers. To guarantee its sustainable long-term function, maintenance works are necessary because rigid and solitary plants are less effective and may even increase local velocities and, as a consequence, erosion. Apart from the shear stress several other factors such as roughness differences, bank angle, straight or curved reaches, etc. have to be taken into account when using vegetation to achieve successful river bank protection.