

# Ecological membrane for slope engineering based on red bed soil

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**Abstract:** Ecological slope protection projects (such as the reinforcement of low slopes by plants and ecological restorations of the soil of high steep rocky slopes) are essential for restoring the natural environment. In this study, red bed soil and composite polymer adhesive materials were used to develop an ecological membrane for application in slope ecological protection. In addition, the basic physical and mechanical properties of the ecological membranes were studied through mechanical tests, and the slope protection and ecological restoration performance was studied through anti-erosion and plant growth tests. The results show that the ecological membrane is soft and tough, with high tensile strength. The addition of the red bed soil can enhance the strength of the ecological membrane, and the ecological membrane with 30% red bed soil has the highest tensile strength. The ecological membrane has considerable tensile deformation capability and viscosity, and the more composite polymer adhesive materials added, the greater the tensile deformation capability and viscosity. In addition, the ecological membrane can enhance the anti-erosion performance of the slope. This study clarifies the development and technology of the ecological membrane, reveals the rules of ecological membrane development, and analyzes the slope ecological protection mechanism of the ecological membrane, thereby providing theoretical and data support for its development, improvement, and application.

**Key words:** Natural weathered red bed soil, optimum proportion, Composite polymer adhesive materials, Ecological membrane, Slope protection project