Textile structures are extensively used in construction in forms of geotextiles. The retrofitting of existing masonry walls and soil structures is particularly important for earthquake protection of historic buildings and protection of earthworks against landslides. Un-reinforced masonry structures are highly vulnerable because being originally designed mainly for gravity loads they often cannot withstand the dynamic horizontal loads in case of strong earthquakes. Soil structures, such as embankments, are subjected to landslides after heavy rainfalls or during earthquakes. Hence the necessity to develop efficient methods for the retrofitting of existing masonry buildings and earthworks and of related monitoring systems to possibly prevent the structural damage.

The broader aim of POLYTECT is the development of new multifunctional textile structures for application in construction for the retrofitting of masonry structures and earthworks. The different functions the textile structures need to incorporate comprise a combination of the following: to increase ductility and structural strength; to monitor stresses, deformations, acceleration, water level variation, pore pressure, to detect presence of fluids and chemicals, to measure structural health. Enabling technologies include the combination of warp-knitted grid-like reinforcing basic structure and rope-like reinforcement, the incorporation of optical fibres into textiles; the incorporation of sensors e.g. by coating fibres with nanocrystalline piezoceramic materials.

The proposed breakthroughs include the: use of textile material as load-bearing part of the building; use of...
multifunctional textiles for stabilisation and monitoring; use of nanostructured materials to tailor the
interface properties; incorporation of sensors based on nanocrystalline piezoceramics and optical fibres,
development of an impedance-based health monitoring technique.

Programme(s)

FP6-NMP - Nanotechnologies and nanosciences, knowledge-based multifunctional materials and new
production processes and devices: thematic priority 3 under the 'Focusing and integrating community
research' of the 'Integrating and strengthening the European Research Area' specific programme 2002-
2006.

Topic(s)

NMP-2004-SME-3.4.4.4 - Multi-functional technical textiles for construction, medical applications and
protective clothing

Call for proposal

FP6-2004-NMP-SME-4
See other projects for this call

Funding Scheme

IP - Integrated Project

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