Textile materials are extensively used in construction. In geotechnical applications, these materials provide reinforcement for slopes, retaining structures, roadways, embankments, as well as various drainage structures. In masonry applications, textiles are growing in importance as they provide a non-intrusive technique to provide reinforcing strength to a structure (damaged or undamaged). Common applications include localised crack repair, the reinforcement of critical walls, or the wrapping of existing columns. Across geotechnical and masonry applications, textile materials improve structural performance under service conditions and provide protection in the event of earthquake, landslide, accident, or other unforeseen loading condition.

Embedding sensors of different types into textile materials enables several important advantages. Structural health monitoring (SHM) can be conducted during construction, under in-service conditions, and post tragedy (i.e. after an earthquake). Such measurements can be used before or after an event to take preventive measures (before) or to assess the state of the structure (after). Measurements over time can be used to track changes in structural performance allowing for maintenance and repair actions when appropriate. In the case of chemical sensing, sensor embedded textiles can be used to detect environmental contamination.

POLYTECT was an integrated project for Small and medium enterprises (SMEs) under the Sixth Framework Programme (FP6). The project involved 27 partners from 12 countries and its aim was to provide reinforcing strength and monitoring capability for geotechnical and masonry applications through the industrial production of multifunctional technical textiles. POLYTECT spanned and included the following activities:
- The development of new and novel sensors. These sensors included fibre optic sensors, piezoelectric sensors, chemical sensors, and sensitive textile fibres (coatings).
- The development of new and novel sensor interrogation systems and data processing techniques.
- The development of nanoparticle-based mortars and adhesives.
- The integration of sensors into warp-knitted textiles for geotechnical and masonry applications (two dimensional and rope like structures).
- The evaluation of these products in a laboratory environment.
- The development of numerical models for the employment of these materials.
- The field testing of project products in real world, tough, and rugged environments.

The client for this work are all parties responsible for the design and safe performance of roads, retaining walls, embankments, railways, landfills, drainage structures, dykes, masonry structures (buildings and bridges), as well as historical monuments (cultural preservation). The different functions the textile structures were captured in the project objectives which were:
- to increase ductility and structural strength;
- to monitor stresses, deformations, acceleration, water level variation and pore pressure;
- to detect presence of fluids and chemicals;
- to measure structural health.

POLYTECT was organised into three general phases. They were:
- Phase I: Product development;
- Phase II: Product laboratory testing and the development of supporting numerical models; and
- Phase III: Product validation in field conditions.

All the phases had been successfully completed. During the fourth year of the project, Phase III was conducted including a series of field tests both for reinforcing masonry structures as well as for geotechnical applications, the two main project areas.

POLYTECT provided, at its end, the capability to obtain information across a variety of geotechnical and masonry applications. Even if the project is currently closed, its partners had planned or were going to plan how to enter the market of civil engineering with the products developed within POLYTECT.

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