



Project title: Research of a textile reinforced pipe system with integrated monitoring functions
(Acronym: SmartPipe)

Partners: Israel Institute of Technology (TECHNION)
Institut fuer Textiltechnik (ITA) of RWTH Aachen University

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Mission Statement

Water distribution is one of the major global challenges for society. A well-maintained water distribution system (WDS) is a major asset for any city or community that supplies water from a source to consumers. A recent World Bank study showed that, annually, more than 45 billion m³ of water are being lost through leakage - corresponding to 35% of the total water supplied worldwide. Although such a waste of resource is no longer tolerable in its own right, since water is treated and often pumped before reaching customers, treatment and energy costs must be considered. For installation and maintenance of water pipes consume large amounts of money in terms of transportation, handling logistics and monitoring. High strength concrete with textile reinforcement offers an alternative to conventional building materials, which in comparison is lighter, stronger, durable and are less affected by corrosion compared to the traditional steel reinforcements. The use of conductive fibers as integrated leakage sensors, by detecting its integrative electrical response, open the way to the development of sustainable hybrid TRC pipe systems.

Approach:

The main research objectives are the development of intelligent pipe structure made of TRC and the development of the associated conductive fiber within the textile reinforcement for realization of the sensory capabilities of the yarns.

In Figure 1 the pursued research subjects combined are forming collectively the innovative research objective of a hybrid pipe made of TRC with integrated monitoring function.

For this purpose, the Institut fuer Textiltechnik of RWTH Aachen University analyzes and produces suitable sensory yarns and examine the textile structure and coating for the project. Simultaneously, the structural behavior of the ultimate load design is analyzed, and the optimal electrical setup of the sensory textile as well as an applicable concreting process are examined by the Technion - Israel Institute of Technology. Subsequently an analysis of the electric measuring unit and the experimental evaluation of the "SmartPipe" occur in cooperation of both institutes.

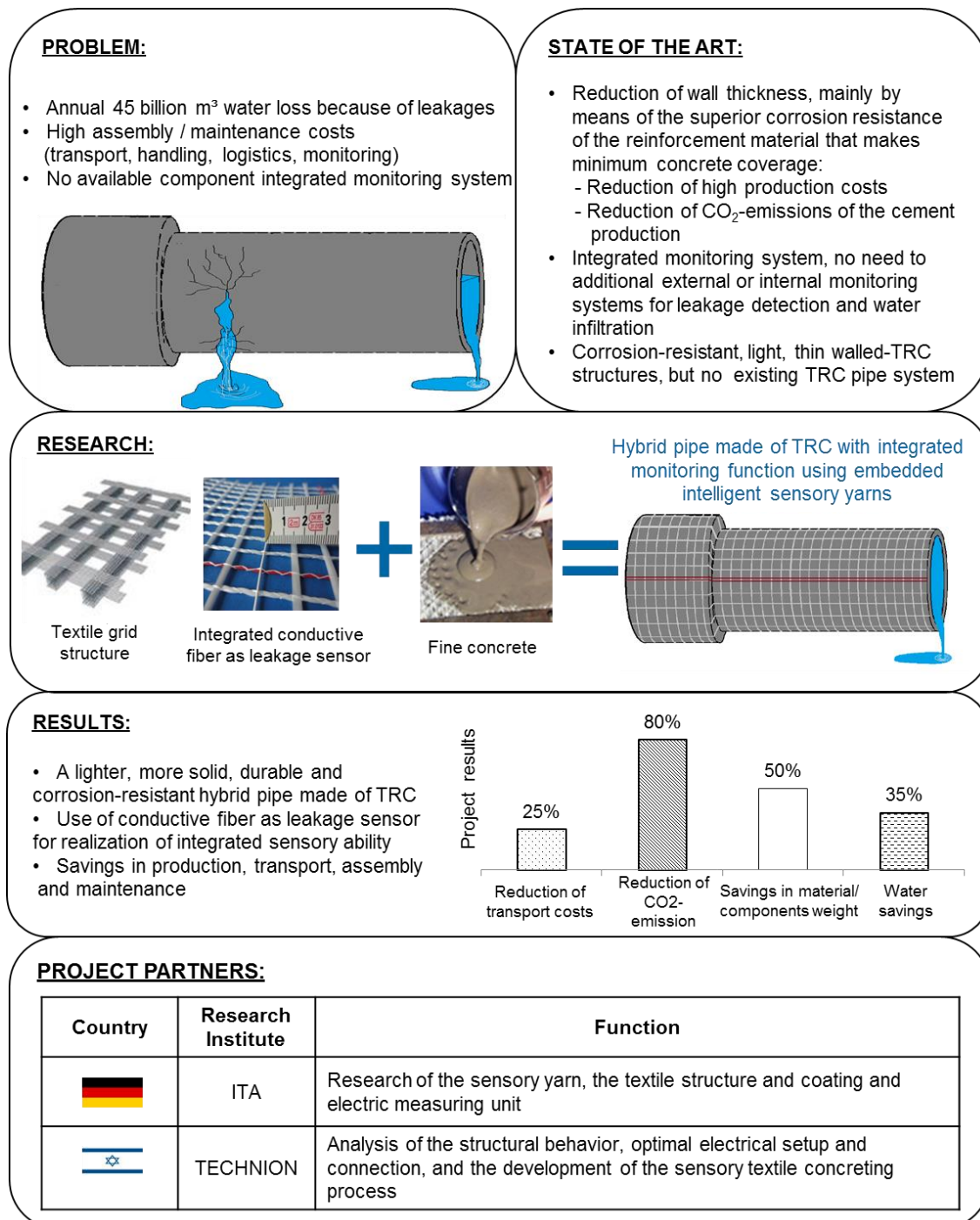


Fig. 1: Mission picture of the "SmartPipe" project

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