

SEISMIC RETROFIT OF HISTORICAL AND EXISTING BUILDINGS

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ABSTRACT

RÖFIX SismaCalce, a new fiber-mortar composite applied on MASONRY walls, ignoring the steel reinforced concrete structure, is the perfect solution for **Earthquake protection**. Karlsruhe Institute of Technology (KIT) and RÖFIX has developed an anti-seismic reinforcement system consisting of (1) RÖFIX SismaProtect, a multi-axial hybrid high-tech tissue, synthetic and glass fibers, alkali- and corrosion- resistant, with (2) RÖFIX SismaCalce coating, a mineral mortar of NHL-Lime + white cement + polymer + bonder by penetrating chemical reaction agent.

Traditional stone and block masonry buildings have low ductility and are usually severely damaged during strong earthquakes. Their collapse could cause building destruction, occupants and passersby loss. Existing walls retrofitted with the new KIT and RÖFIX system, gain high ductility and low modulus of elasticity and adapt perfectly to the different requirements of new buildings, but also and especially of old and existing ones. During earthquake, the system improves the seismic stability of the global structure: retrofitted masonry walls becoming the main elements of building stability, working as sheer resistant walls holding the slabs. The earthquake-induced movements and energies in the masonry can be absorbed through the fiber mesh (Figure 1). Forces and force peaks distributed in the mesh are reduced by the special mortar (Figure 2). Although cracks and partial damages of the structure develop a complete collapse, however, can be prevented, saving human lives.

This innovative, economic and eco friendly system also offers thermal insulation and vapor diffusion permeability. It ensures safety, energy conservation, quality of life and property value. It is easy to handle and can be embedded on all masonry walls.

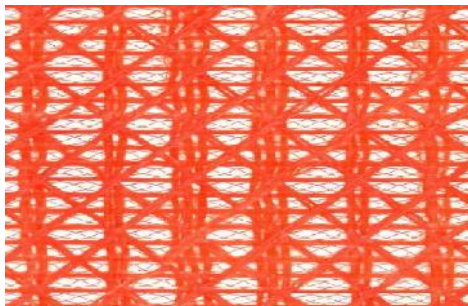


Figure 1. RÖFIX SismaProtect
Fibers overcome the shear strength



Figure 2. RÖFIX SismaCalce
Stone + mortar overcome the compression strengt

SISMA CALCE MATERIAL PROPERTIES CALCULATION - KIT

Professor Doctor-Engineer Lothar Stempniewski and Engineer Moritz Urban, Karlsruhe Institute of Technology, Germany, established calculations of material properties and fiber reinforcement.

Parameters for in-plan shear :

With f_m = compressive strength masonry; f_{tk} = tensile strength masonry; f_d = designed compressive strength of masonry; p = average normal pressure in the wall;