



**Natural stones like GRANITE and BASALT become with patented technology a mechanically high quality LIGHTWEIGHT-CONSTRUCTION-MATERIAL with custom specific adaptable properties**

## MCT<sup>®</sup> - MINERAL COMPOSITE TECHNOLOGY – INTRODUCTION

Fibre composites have changed a lot in mechanical engineering, especially the way of construction. This opens up a rethinking of materials in general, while a combination of fibres with other material as a next step will provide new possibilities to overcome the disadvantages involved with fibre composites.

Currently there are little alternatives in materials that match the properties of carbon fibres for example, if it comes to thermal elongation and mechanical stability and stiffness. However most of these stiff fibrous materials do not answer the question about necessary damping and their environmental impacts by pollution and production energy, also meaning CO<sub>2</sub> - emissions.

### Classic building material becomes construction material

An old material, well known in development of human mankind, meets these requirements. Stoneware like granite, basalt and concrete, intelligently combined with fibre materials, especially carbon, can be used as construction material, both in civil and mechanical engineering, adding missing mechanical properties and provision of less energy needed for their production.

### Well-known building material (p)reloaded

Natural and artificial stoneware is well accepted as building material, its pressure-resistance and durability has been proven in many cultural relevant architectural monuments. Almost every country in the world has stone, the techniques of production and processing are simple, environmentally friendly and inexpensive. While stone reacts sensitive under tension, it is hardly known that its property - which very few pressure-resistant materials have - to change volume under pressure allows a wide range of flexibility in case the stone is permanently kept under pressure. This is due to the porosity of hard rock, which allows MCT<sup>®</sup> to set the surface of the stone under preload by fibrous materials and thus allows tension and bending forces. What seems to be impossible for natural stone becomes reality under preload: non-destructive bending elasticity and resistance at unmatched vibration damping and adjustable thermal expansion. This opens up completely new application areas and different alliances of partners of earthenware and fibres, which can provide a variety of technically useful application-specific properties.

### Light weight like Aluminum

The actual weight of stone is also hardly known. Granite and Basalt as the hardest, strongest and heaviest of the natural rocks have with 2,6 - 3.0 g/cm<sup>3</sup>, depending on the type of stone, not much more than the specific gravity of aluminium with 2.7 g/cm<sup>3</sup>. Thus stone is a lightweight material and has the potential to replace the environmentally problematic metal in many application areas, when it is possible to construct as slim as with aluminium at the same strength. Thermal elongation – problematic with aluminum as well – can be adjusted to specific needs by intelligent mixture of the two components, while the stone surface can still serve with its beauty and surface advantages. With up to 1.5 mm thin, fibre-coated stone sheets,

for example, pipes of rectangular cross-section can be made and serve as longitudinal or cross bar.



Longitudinal beam (cross section 50mm x 80mm) from 2,5 mm CFS<sup>®</sup>- material

### The desire for new materials

In the pursuit of lighter and adaptable hybrid materials, the natural stone industry has been already providing pioneering work. Stone slabs reinforced with steel frames, bonded honeycomb and fiberglass, having a total thickness of 10 mm and below succeeded to make stone plates more durable, thin panels and lightweight kitchen table tops have been established in the market since a couple of years now.

### Synergy of stone and fibre: appeal for many applications through scalable synthesis of the best individual properties

A material called CFS<sup>®</sup> (CarbonFibreStone), a combination of Carbon Fibre and hard stone like Granite, using MCT<sup>®</sup>, goes a significant step beyond existing technology and sets the surface of hard rock with help of carbon fibres under permanent preload pressure. This results in a construction material similar to steel and aluminum, which provides a ratio of stability vs. weight being two times higher than that of steel and concrete, very similar to that of aluminium, providing the robustness of the fibre, which is located either in the outer layer of the material or right in the middle between the plates.

In combination with unmatched damping characteristics, the new CFS<sup>®</sup> material can be used in applications of civil engineering, supporting vehicle frames, ultra-light and thin stone flooring in aircraft application, low-expansion support of telescopes and solar power plants, for damped structural parts in wind turbines and robotic arms, as well as precision measurement instruments and any kind of interior design.

### Application determines alliance partners

MCT<sup>®</sup> allows the combination of any type of fibre with any kind of earthenware, their different combinations are possible with the help of an adaptive preload technology. The surface of stone can be used for its beauty, robustness and ultimately low aero- and hydrodynamic resistance. MineralCompositeTechnology<sup>®</sup> is creating a technically superior combination of features and a completely new basis for highly innovative and beautiful mechanical concepts.