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MINISTRY OF RESEARCH, INOVATION AND DIGITIZATION

National Institute for Research and Development in Construction, Urban Planning and Sustainable Spatial Development "URBAN-INCERC"

PRELIMINARY RESEARCH FOR INTEGRATION OF ABRASIVE GARNET SAND WASTES IN INNOVATIVE CONSTRUCTION MATERIALS AND PRODUCTS

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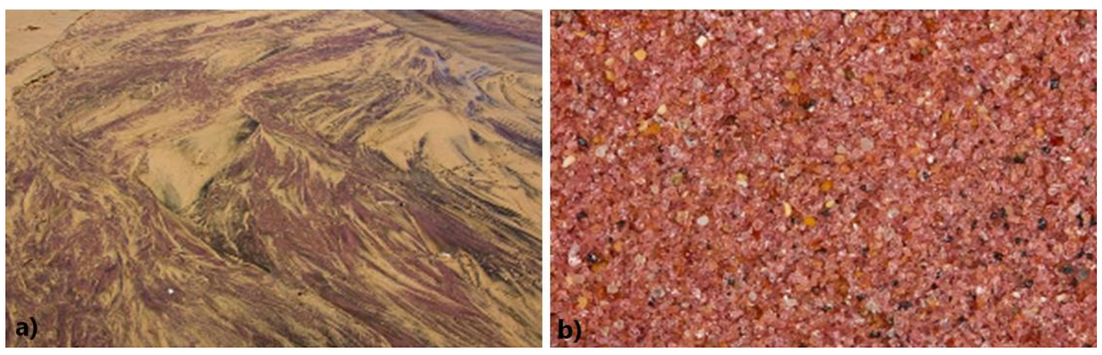
I. WATERJET CUTTING OPERATIONS FOR MATERIAL PROCESSING INDUSTRY



a) Coastline of Pfeiffer Beach, California, USA - Garnet mineral ; b) Australian Garnet sand, general aspect

Garnet - is a silicate rock-forming mineral, occurring in many rock types. Usually, sand contains low quantities of Garnet, with some exceptions, when indeed Garnet can be the sand-forming mineral.

The waterjet cutting operations used for material processing was improved by using **abrasive granular sands of Garnet** type as complementary cutting material

The waterjet cutting operations were extended to a large variety of processed materials: stone, granite and marble cutting, metal working (Carbon and Stainless Steel, Aluminum, Copper), glass and ceramic, FRP and Carbon fibre, plastic and timber cutting etc.

Waterjet cutting operations with complementary Garnet abrasive

II. GENERATING GARNET WASTES

Waterjet sludge

a) Garnet waste dumps; b) Dry raw state of Garnet wastes

III. SOLUTION

GARNETs wastes could be valorized by innovatively integrating them in construction materials and products, as partial replacement of sand and/or fillers

Preliminary studies: the use of Garnet-type waste as a fine-grained substitute in:

a) Cement-based compositions

b) Alkali activated geopolymer concrete

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