



Joint Research Project

Development of Ecomaterials for Low-Cost Housing



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≻Objective

This joint research project is intended to study pozzolans derived from mineral or agricultural sources in developing countries and understand their effect as cement replacement in concrete. Through combined research in the field and characterisation tools available at EPFL, we hope to be able to support consistent production processes to predict the long term behaviour of such materials.

The solid fuel block (SFB) concept for the production of reactive pozzolans 1. Raw Materials: 2. Mixing: 3. Compression: Industry Agriculture clay Straw Sugar cane straw, RHA. Sawdust Solid Fuel Block (SFB) " Fuel " " Binder " 4. Calcination of SFB 6. Blending Grinding Cement Reactive Pozzolan Ball Mills Lime Vertical Shaft Kiln (750°C-900°C) 1. Scanning Electron Microscopy (SEM) ➤ Microstructural analysis of blended cement concretes Typical measurements with this instrument include Hydration rate of the cement and its porosity. It is also equipped with an Energy Dispersive Spectrometer (EDS) for chemical analysis and phase identification zeolite grain Matrix of hydrated products (mainly C-S-H) portlandite (CH) anhydrous cement phases (C₃S, C₂S, C₃A,...) 2. X-Ray Diffraction (XRD) Microstructure of a 28 days cement paste where 50% by weight of the cement has been replace by a Lime-pozzolan (zeolite) binder 3. Isothermal Calorimetry PANalytical X'Pert Pro X-Bay diffraction system XRD Diffractogram of a 28 days cement paste From where 30% by weight of the cement has bee replaced by a Lime-pozzolan (zeolite) binder

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Hydration kinetics of different mixes, represented by the specific heat released [mW/gr] as a function of time

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Laboratory level to full scale trial in the field...

