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Valorisation of soils from Kinshasa and Kongo Central regions (Democratic Republic of Congo) for raw earth bricks

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ABSTRACT. —Soil is a building material widely used in Kinshasa and Kongo Central regions. Its exploitation is generally artisanal. Soils extracted are largely used for the manufacture of wood-fired bricks, with consequent deforestation problems (Mango-Itulamya, 2015). In order to limit the production energy cost and to produce a sustainable building material, the use of raw earth bricks seems to be a solution. Six areas containing important soil deposits have been selected: Kinshasa, Mbanza Ngungu, Kasangulu, Nkamba, Kwilu Ngongo, and Lukala. Soils of these 6 zones were sampled and used to make raw earth bricks.

Field missions consisted in prospecting for soil deposits and representative sampling. Laboratory analyses covered the characterization of soils samples by particle size distribution, plasticity, and mineralogy. The next step was the production of Compressed Earth Bricks (CEBs) which were characterized by their mechanical and hygrometric properties. All these tests were done in the Geotechnology Laboratory and in the Argiles, Géochimie et environnements sédimentaires Laboratory of the University of Liège. An improvement in compressive strength and durability (resistance over time) is obtained with the addition of sand, bagasse and sand-cement. The treatment with 7.5% bagasse results in a satisfactory dry strength, however, the resistance after 6 cycles of wetting-drying is altered by 25%. The treatment with 50% sand and 6% cement gives also a satisfactory dry strength. The resistance decreases by 2% after 6 cycles of wetting-drying, and thus remains higher than in the other mixtures.

Raw earth bricks are an alternative solution to the housing problem in the Kinshasa and Kongo Central regions. However, projects of sensitization must be carried out with local populations which continue to consider the raw earth as "material of the poor man" and do not yet consider the use of raw earth bricks.

REFERENCE

MANGO-ITULAMYA, L.A. 2015. Valorisation des géoressources argileuses de la région de Kinshasa pour améliorer la qualité et la durabilité des matériaux de construction utilisés dans l'habitat périurbain. Master's thesis. — Liège, Université de Liège, 90 pp.

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