COLLEGE OF ENGINEERING, DESIGN, ART AND TECHNOLOGY

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INVESTIGATION OF STRUCTURAL CHARACTERISTICS OF VERNACULAR MATERIALS FOR CONSTRUCTION OF EARTHQUAKE RESISTANT SYSTEMS IN WESTERN UGANDA

By

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ABSTRACT

Earthquake disasters in Western Uganda are common resulting from destructive earthquakes that have a return period of two to three decades. The destructive mechanism of earthquakes of such magnitudes is vested mainly in the destruction of man made structures.

Materials used for construction are categorised as formal and vernacular materials. Much as the vernacular materials are reasonably cheaper than the formal ones because of their local availability, they do not have catalogued structural quality characterisation. Hence the study of investigation of structural characteristics of vernacular materials for construction of earthquake resistant system in Western Uganda was the focus.

The specific objectives of this research were to: generate an inventory of vernacular materials with quality characterization for construction of earthquake resistant systems, establish design parameters for such construction, develop prototype design of low cost earthquake resistant systems and enhance structural analysis of vernacular materials based infrastructure.

The literature reviewed indicated that most of the previous research concentrated on the formal materials such as steel, cement and modified vernacular materials such as burnt clay bricks, concrete and converted timber. Such studies left out vernacular materials structural quality characterisation demand for construction of earthquake resistant systems.

Through this study, methods used for data collection included questionnaires, personal interviews, laboratory tests and computer modelling using CANNY soft ware.

Results of tests in this study were analysed using graphical methods and statistical packages. Structural strength characterisation of a given material was based on the functionality of the structural elements where such a material is used.

Through out the study vernacular materials with their structural strength characteristics appropriate for construction of earthquake resistant systems in Western Uganda were established and documented.

Recommendations made through the study were on gender equity and entrepreneurship in construction industry, structural design and analysis of fibro-reinforced structures, quality control via utilisation of CANNY software, and further research.

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