

Behaviour of Composite Structural Members Built-Up from Locally Available Stone Units Jacketed with Ferrocement

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Abstract

In this study, the traditional building system using locally available stone units is re-engineered by adding a ferrocement jacket to the original stone member. This technique did not only improve both the strength and behaviour of the new composite section, but also will be more economical by saving the land cost due to the reduced section width and extend the service life expectancy of the building. Nine types of stones were taken from different quarries in the North and West region of Iraq and were subjected to preliminary compressive strength tests to select three of them based on their grade of strength for further and more in-depth mechanical properties investigation to be used in building the structural members in this study. Both beam and column sections are investigated. The variables were the type of the stone used and the number of wire-mesh layers in the ferrocement jacket. The results indicate that regardless the type of stone used, weak medium or strong, the number of wire-mesh layers is the dominant parameter and the more the number of wire mesh layers the more strength and better behaviour is resulted. Using 6-layers of wire-mesh in the ferrocement jacket led to an increase in the beam ultimate flexural strength of 245.9% and column axial compression strength of 94.3%. In addition, stiffness, ductility, toughness, and mode of failure are also investigated and shown to be improved with ferrocement jacketing.