

## **Abstract**

In this paper, a new technique is proposed to confine concrete columns using GFRP-prefabricated bonded shells and a shrinkage-compensating cement mortar. The confinement is performed with three identical shells, each of which contains two stepped lap joints at their ends. The main advantage of this technique is that the shells can be directly assembled on site by structural bonding to cover any column shape. The gap between the shells and the column is filled with shrinkage-compensating cement mortar. To evaluate the efficiency of this technique, several concrete specimens were confined, instrumented and tested under monotonic compression. To simulate the actual strengthening conditions, the load was directly applied on the concrete cross-section. The results show clearly the benefits of an efficient confinement in terms of a noticeable increase in the axial strength and ductility where the stress-strain curves are characterised by a third softening phase and the failure mode which spread over the whole length of the shells