

This research is a contribution to work on strengthening and repair of reinforced concrete structures, it presents a comparative study between two methods of repairing damaged concrete with an experimental investigation on the behavior of specimens initially pre-damaged up to intense cracking, repaired by increased concrete section and by bonding a carbon fiber reinforced polymer. In our study, the concrete columns with square sections of  $(15 \times 15)$  cm<sup>2</sup> and a height of 30 cm are tested under uniaxial compression loading up the damage, these columns have been repaired, using both methods, they are tested again and their behavior has been studied. Based on the criterion of Mohr–Coulomb failure, a model was developed for each method to validate the different results obtained experimentally. The experimental results show that the method to repair damaged concrete by carbon fiber reinforced polymer has a good substrate adhesion, which offered a great improvement in strength and ductility compared to the method by increased concrete section. The experimental results have been compared with the theoretical models, a good correlation was obtained