Abstract- One of the new concrete technology applications that had to get increased importance as repairing and retrofitting technique is slurry infiltrated fiber concrete (SIFCON). This research aims to investigate some of the mechanical properties of SIFCON and its role in improving the useful life of normal concrete. The research consists of two parts; in the first part, three mixes are prepared with 0%, 1.5%, and 6% volume fraction steel fiber content. Compressive strength, flexural strength, total absorption and apparent density tests are made for each mix. In the second part, a composite section of normal concrete and SIFCON mix with 6% steel fiber is prepared. Different thicknesses of SIFCON layer had been casted to assess its benefits in repair and/or to strengthen of defected buildings. Flexural strength, toughness, ductility and load-deflection curve are examined for the composite sections. The results showed that the flexural strength of SIFCON with 6% steel fiber content increased up to 600% and 200% comparing to those recorded with the reference mix and 1.5% steel fiber concrete respectively. The results also indicated that the increase of SIFCON layer thickness would improve the mechanical properties of the composite section. Also, the maximum increase in flexural strength was greater than four times the reference mix. Better behavior is also recorded in load deflection and toughness of SIFCON composite section.

Keywords- SIFCON, Slurry infiltrated concrete, steel fiber, strengthening of concrete, sustainable concrete.