Self-Compacting Concrete (SCC) is a type of high-performance concrete types that is able to flow under its own weight up to leveling, completely fill the formwork even in the presence of dense reinforcement, air out, compact and consolidate without the need for any vibration, whilst maintaining homogeneity due to high resistance to segregation.

This research aims to investigate the properties of the SCC produced by using locally available materials and to study the effect of using local rocks as a coarse aggregate such as quartzite, dolomite and limestone with two replacement ratio 50% and 100% of traditional coarse aggregate (gravel).

The slump flow, V-funnel, and L-box tests are adopted to achieve the SCC criteria (flowability, passingability and segregation resistance) for fresh SCC mixes. The results indicate that SP dosage increases to 1.67% and 2.08% for the (50% replacement) and (100% replacement) by the traditional gravel of different coarse aggregate rocks compared to reference mix that contain gravel.

The tests that were carried out on hardened concrete at different ages of 7, 28 and 90 days are compressive strength, splitting tensile strength, flexural strength, ultrasonic pulse velocity, density and absorption of the SCC mixes. The SCC mixes prepared with full and 50% replacement of quartzite gives higher compressive strength, splitting, flexural, UPV, absorption and density compared with mix that contained gravel with percentage of enhancement (11.9%), (9.5%), (12.4%), (2%), (31.9%) and (1.1%); respectively for fully replacement.

On the other hand, it has been noticed that the concretes prepared with full and 50% replacement of dolomite give lower compressive strength, splitting, flexural, UPV, absorption and density compared with mix that contained gravel with percentage of detraction (10.3%).
(4.8%), (5.9%), (1.2%), (13.5%) and (1%), respectively for full replacement. Also, for both full and 50% replacement; limestone exhibits the same behavior of dolomite but with larger percentages of detraction which are (24.2%), (33.3%), (27.1%), (3.6%), (53.2%) and (3.5%); respectively for fully replacement.