

# **Enhancing of Concrete Properties by Using Aluminium and Iron Residues as a Partial Replacement of Fine Aggregate**

Ammar Ahmed Hammadi, Aseel Madallah Mohammed, Majeed Mattar Ramal

## **Abstract**

According to the growing of the world's population, the necessitate for using different building materials such as cement, steel, admixtures, wood and aluminium increased. The main problem faces the world with the increasing need for building materials is the construction wastes, which are a type of environmental pollution that must be reduced. This study focused on aluminium and iron wastes resulted from factories and the possibility to reuse these wastes again like partial replacement from sand with proportions (0.25, 0.5, 0.75 and 1%) in concrete mixtures for both types of residues at ages (7, 14, and 28) days. It had studied the effect of the using of aluminium residues (AR) and iron residues (IR) especially on the mechanical characteristics of concrete. These mechanical characteristics were the compression strength (CS) and tensile strength (TS). The achieved results were compared between the residues concrete specimens and those of reference concrete. Also, the effect of age and replacement percentage for samples which they contain AR and IR had been discussed. The results had shown that the (CS) of iron residues concrete samples (IRC) was increasing with increasing of the iron residues percentage till (0.5%) (IR) in opposite of the observed values of aluminium residues concrete (ARC), as well as for the results of the (TS) of concrete samples which containing the mineral residues at all ages. Where it was observed that the using of aluminium residues (AR) showed a decreasing in the values of (TS) and (CS) compare with reference concrete, but with the use of iron residues (IR) both of (TS) and (CS) results were more than their counterparts of reference concrete at all ages for the first two percentages of replacement