

## **Durability Properties of Mortar Containing Steel Slag as Supplementary Cementitious Material**

*X. Li\*, S. I. Doh, C. M. Ho and M.I. AlBiajawi*

Faculty of Civil Engineering Technology, Universiti Malaysia Pahang, 26300 Gambang, Pahang, Malaysia

\*Corresponding author: mr.leexiaofeng2018@gmail.com

### **Abstract**

The use of steel slag (SS) as supplementary cementitious material (SCM) is promising from the perspective of environmental protection and resource utilization. Previous studies have shown that using < 20% SS powder to replace cement is able to ensure the strength of concrete, while > 20% SS replacement tends to decrease the strength of concrete. However, few studies have investigated the effect of SS on the durability properties of concrete, such as resistance to ammonium nitrate attack and resistance to sulfate attack. In this study, SS powder has been used as SCM with replacement ratio of 0, 10%, 20%, 30% and 40% to manufacture mortar. Compressive strength test, ammonium nitrate attack test and sulfate attack test have been conducted to investigate the properties of hardened mortar specimens. From this study, it is concluded that the increase in SS replacement ratio caused the decrease in mortar strength, the exposure to sulfate solution could increase the strength of mortar, and the exposure to ammonium nitrate solution led to the decrease in strength of mortar.

*Keywords:* Steel slag; Supplementary cementitious material; Ammonium nitrate; Sulfate.