

## **A review of alternatives traditional cementitious binders for engineering improvement of soils**

### **ABSTRACT**

There is a burgeoning interest in the development, characterisation and implementation of alternatives to cement and other cementitious binders in civil engineering frameworks (i.e. ground improvement). This interest is in part because of the technical advantages and related to environmental and energy issues, particularly in CO<sub>2</sub> gas emission challenges in another part. The current paper presents a brief history and a review of alternatives for traditional cementitious binders including pozzolanic materials, alkali-activated materials and reinforcement inclusions. In this respect, the summaries and analyses of the most significant research findings attempt to elucidate chemistry and reaction mechanisms, environmental benefits and underline the reasons why these promising materials have become widely used in construction industry and specifically for the purpose of soil improvement over the last 30 years. Finally, the paper proposes further research and development topics and suggests steps forward to enhance the potential of these materials for ground improvement.

**Keyword:** Soil improvement; Alkaline activation; Geopolymerisation; Pozzolanic materials; Reinforcement materials