

Evolution of soil stabilization using Nanomaterials

Ali Akbar Firoozi

Universiti Kebangsaan, Malaysia

The construction industry is increasingly turning to the use of environmentally friendly materials in order to meet the sustainable aspect required by modern infrastructures. Consequently, in the last two decades, the expansion of this concept, and the increasing global warming have raised concerns on the extensive use of Portland cement/fly ash due to the high amount of carbon dioxide gas associated with their production. Soft clays are associated with low compressive strength and excessive settlement. This reduction in strength due to moisture leads to severe damages to buildings and foundations. The soil behavior can be a challenge to the designer build infrastructure plans to on clay deposits. The damage due to the expansive soils every year is expected to be \$1 billion in the USA, £150 million in UK and many billions of pounds worldwide. The damages associated with expansive soils are not because

of the lack of inadequate engineering solutions but to the failure to identify the existence and magnitude of expansion of these soils in the early stage of project planning. The development of nanotechnology and nanomaterials offer promising signs for a change in the way of construction and geotechnical projects. Nanotechnology, as a new industrial revolution, has brought numerous opportunities to a variety of scientific, engineering and technological sectors. The bottom-up synthetic strategy in the transitional zone between atom and molecule creates Nano-dimensional materials with novel physical and chemical properties. Hence, soil improvement with nanomaterials is a new technique to tap the significant advances made in nanotechnology which has made nanomaterials cheaper and robust material to compare with traditional methods in the future.

e: afiroozi@siswa.ukm.edu.my