THESIS INFORMATION

Title: **RESEARCH ON CLAY MUD STRUCTURE REINFORCEMENT TO IMPROVEMENT SOFT SOIL BASE ON GEOPOLYMER TECHNOLOGY**

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Major code: **62.58.02.04**

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Constructions on soft ground often face many problems such as low load capacity of the foundation and prolonged settlement over time. This is a difficult problem for construction engineers and needs to take measures to overcome the problem. The cause of the above problem is the structural and structural characteristics of soft soil. One of the most popular soft soil types is clayey mud, which is composed mainly of clay particles less than 2μm in diameter, loosely linked with large porosity. To improve the above soft soil to a better soil type in the construction sector: capable of creating a large load capacity with small subsidence, it is necessary to take measures to change the soil structure to become more dense, bonding between particles is tighter. The currently widely implemented solution to achieve this goal is to use a cementitious binder to mix with soft soil. The cement-mixed soil pile method is typical of the above solution, which has been widely used in construction practice.

This thesis presents a new approach which is to take advantage of the ash and slag waste of coal-fired power plants to strengthen the structure of weak clay based on geopolymer technology to achieve the dual goal of soil treatment. construction works and reduce environmental pollution by reducing the source of ash and slag waste. With the scientific basis presented in the thesis, combined with laboratory test results and field model experiments, it shows the applicability of fly ash soft ground treatment solution based on geopolymer technology. bring high efficiency in terms of technology, economy and

environment, thoroughly solve the adverse phenomena when building works on soft soil, because it has changed the structure of soft soil and made soft soil become soil has better construction properties.

Soft soil after being treated can be used as a building foundation or used as a filling material for road construction parts, useful structural parts in underground construction.

The analysis results by finite element method performed in the thesis confirm that the use of geopolymer cushions, geopolymer columns made of geopolymer materials synthesized from soft soil and fly ash contributes to a significant reduction in settlement and transverse displacement of the soil embankment on soft soil. When using geopolymer material on the back of the tunnel wall, it significantly reduces the earth pressure on the wall, and at the same time reduces the internal force on the wall.

This thesis contributes to theoretically perfecting the use of geopolymer binders to improve the physical and mechanical properties of soft clay, clarifying the potential of using geopolymer technology for foundation design and construction and underground works.

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