

An Overview SOIL SOIL STABILIZATION

IR. ZURAINI BINTI ZAINAL

MAKMAL PENYELIDIKAN GEOTEKNIK (MPG)

Soil Stabilization

A process of mixing other substances/materials with original soft ground/ expansive soil in attempt to improve the geotechnical properties for particular construction.



Soil Stabilization Purposes

To improve shear strength

2

To enhance soil resistance to the weathering process

4

To enhance load-bearing capacity

To improve permeability

3

To meet specific engineering projects requirement

5

Soil Stabilization Methods

01 Decreasing the void rate **MECHANICAL** through compacting 02 Addition of cement to a **SOIL-CEMENT** soil to produce a weak form of concrete Addition of lime to a soil 03 to generate long-term SOIL-LIME strength gain through a pozzolanic reaction 04 Mixing bitumen to a soil **SOIL-BITUMEN** to produce stable base 05 Implementing various **CHEMICAL** additives as agent of stabilizer

Categories of Soil Stabilizer



Noncementitiuos

> Stone dust, quarry dust, aggregate waste, rock waste powder, crusher dust, granite saw dust, sand

Supplementary cementitious additives

2

Lime, fly ash, groundgranulated blast furnace (GGBS), cement kiln dust, lime kiln dust, silica fume. Chemical additive

3

CaCl₂, KCL, Na₂SiO₃, FeCL₃, Mg(OH)₂, Na(OH), NaCL, MgCl₂, Al₂,Cl₃

Source: Reddy & Tahasildar, 2015

Silica fume







Soil Stabilizer from Solid Waste

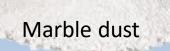
hcinerator waste

> Domestic waste

Agricultural waste

Quarry dust

Mineral waste





Significance of using solid wastes



26 juta tan sisa pepejal terkawal yang dijana setiap tahun

Sumber: Pelan Tindakan Komprehensif Pengurusan Sisa Pepejal 2015 – 2020 (Cetakan tahun 2014)

Operationalising the Twelfth Malaysia Plan, 2021-2025

Environmental Sustainability

Conservation and preservation

- · Climate change mitigation and adaptation
- Disaster risk management
- Disaster risk insurance scheme



Green technology

- Management of of green and blue economy
- Biodiversity conservation
- Sustainable forest management
- Sustainable Consumption & Production
- Energy efficiency
- Renewable energy
- Integrated water resource management
- Marine litter
- Waste as commodity
- Circular economy reducing waste and creating value from waste
- Valuing ecosystem services
- Carbon Tax

Conclusion

- 1. Soil Stabilization can improve the performance of existing soil.
- 2. Soil stabilization provides a solution to soft ground/expansive soil.
- 3. The most commonly soil-cement, soil-lime and soilbitumen stabilization have been used in JKR's Project. By soil stabilization, the cost of the project also can be reduced.

Conclusion

4. Currently, CREaTE is doing research on the effectiveness of Nano Polymer as soil stabilizer

5. Solid waste as soil stabilizer :

Alternative method.

Reduce the quantity of solid waste in Malaysia

Eco-friendly and Sustainable