

The image shows the cover of a spiral-bound notebook. The cover is a light beige or tan color with a fine, woven fabric-like texture. On the left side, there is a silver metal spiral binding. The text is centered on the cover in a bold, black, serif font.

PERBAIKAN TANAH SECARA KIMIAWI

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PRINSIP DASAR

Mengubah komposisi fisik dan kimiawi tanah dengan menambahkan admixture sehingga terjadi peningkatan kepadatan dan kohesi serta modulus kekakuan tanah terhadap pembebanan

Jenis perbaikan yang dilakukan:

- Penambahan Admixture (di permukaan dan pada kedalaman tertentu)
- Penggunaan Grouting
- Metode Thermal (Heating & Freezing)

Bahan Kimia yang umum digunakan

- Kapur (Quicklime: CaO ; Hydrated Lime Ca(OH)_2 ; Lime Slurry : Larutan quicklime atau hydrated Lime dalam air)
- Semen (berasal dari debu akibat proses pembuatan semen) (CKD)
- Portland Cement (PC)
- Fly Ash (Sisa pembakaran Batu bara berupa pozzolan yang mengandung AlO_3 , SiO_2 , Fe_2O_3) Ada 2 tipe : Class C dan Class F
- Bitumen
- Additif Lainnya

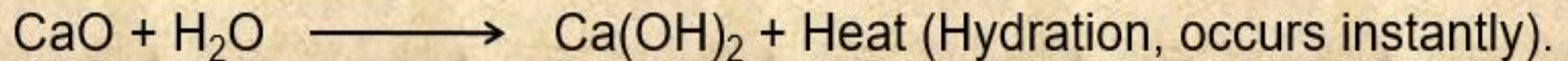


Proses stabilisasi dengan kapur / lime

Lime

Kapur atau Lime digunakan untuk stabilisasi tanah lempung plastisitas tinggi (CH) dengan $PI > 10$

Initial Soil Drying:




Modification:

Flocculation and agglomeration process where calcium ions of hydrated lime replace sodium and hydrogen ions from surface of clay particles, resulting in a soil with friable and granular characteristics and reduced plasticity index. (Occurs within hours).

Stabilization:

Breaking down clay particles, releasing silica and alumina, which react with calcium from lime into CSH and CAH cementitious matrix. (Occurs within hours and can continue for years).

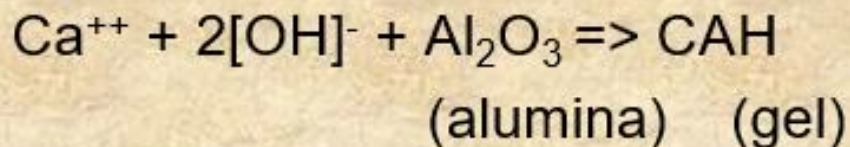
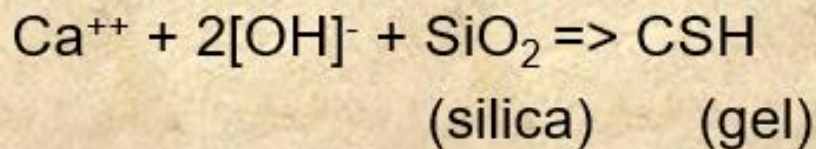
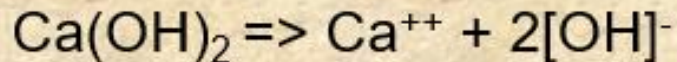
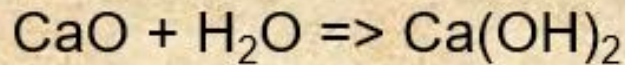


Proses stabilisasi dengan Fly Ash

Class C Fly ash digunakan untuk stabilisasi tanah dengan klasifikasi (ASTM) SM sampai CL-ML dan juga CH

Class C Fly Ash

Pozzolans react with lime and water to form cementious material.



Proses stabilisasi dengan Semen (CKD)

Gabungan Proses stabilisasi dengan Kapur dan Proses stabilisasi dengan Class C Fly Ash

Semen digunakan untuk stabilisasi tanah dengan klasifikasi (ASTM) SM sampai CL-ML dan juga CH

Mix Design


- Quicklime: CaO antara 3 – 6%
(dari berat tanah)
- Hydrated Lime Ca(OH)_2 antara 5 – 7%
(dari berat tanah)
- Semen (CKD) antara 5 – 8%
(dari berat tanah)
- Portland Cement (PC)
- Class C Fly Ash antara 12 – 17%
(dari berat tanah)

Pelaksanaan, Peralatan yang diperlukan


- Typical Equipment

- Graders and Scarifiers
- Spreaders
- Mixers and Pulverizers
- Sheepsfoot and Pneumatic Rollers
- Sprinklers
- Trucks






Pelaksanaan, untuk stabilisasi kapur (Lime)


- Typical Mixing Process for Lime
 - Application and Spreading of Dry Additive
 - Mixing & Moisture Condition +3-5% omc
 - 1st mixing within 6 hrs from application, lightly roll, and allow curing of 48-72 hours.
 - Final mixing after curing and until 100% < 1-1/2" Sieve and 60% < #4 Sieve.
 - Compaction & Moisture Condition
 - Typically -2 to +2% omc
 - Finishing and Curing
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Pelaksanaan, untuk stabilisasi fly ash

- Typical Mixing Process for Fly Ash
 - Application and Spreading of Dry Additive
 - Mixing & Moisture Condition
 - 1st Mixing of soil and fly ash on dry of omc until 100% < 2-1/2 inches
 - Final mixing and add water +2 to 5% omc until 100% < 1-1/2" Sieve and 50% < 3/4" Sieve.
 - Compaction within 2 to 3 hours from application
 - Immediately following final mixing, and such that moisture ranges -2 to +2% omc
 - Finishing and Curing



Pelaksanaan, untuk stabilisasi semen (CKD)

- Typical Mixing Process for CKD
 - Application and Spreading of Dry Additive
 - Mixing & Moisture Condition
 - Mixing and add water +0 to 6% omc, continue mixing until 100% < 1-1/2" Sieve.
 - Compaction may be delayed 24 hrs after mixing
 - No extended curing time required as with lime and no narrow time window between application and compaction as with fly ash.
 - Finishing and Curing
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A silver metal spiral binding is visible on the left side of the page, looping through a series of holes in the paper. The background is a light beige color with a thin horizontal line across the middle.

Terimakasih