BAB 6
KESIMPULAN PENELITIAN

Beberapa poin yang dapat disimpulkan dan disarankan untuk perkembangan penelitian di masa mendatang:

1. Sesuai pengujian skala utuh yang dilaksanakan di lapangan di mana pada kadar air diestimasi sebesar 38.3 %, daya dukung diprediksi mencapai 45 ton/m^2, atau sekitar 25 ton untuk fondasi dangkal berongga berdimensi 80 cm x 80 cm. Menurut pedoman tentang pembebanan (mengadaptasi secara praktis dari SNI 1727-2020 mengenai beban desain minimum untuk bangunan gedung), suatu struktur bangunan rumah sederhana sebesar 1 ton/m^2 per lantai [52] dengan area cakupan (*tributary area*) tipikal seluas 3 meter x 3 meter per kolom, akan menyalurkan beban sebesar 9 ton per kolom. Berdasarkan hasil uji beban, dapat disimpulkan bahwa sistem fondasi dangkal pracetak berongga yang diusulkan pada kondisi ini dengan dapat faktor keamanan >2,5.
2. Daya dukung tanah terbukti mengalami penurunan terhadap penambahan kadar air. Secara spesifik, setiap penambahan 10% kadar air, maka terjadi reduksi daya dukung sebesar 8 ton/m^2. Saat kadar air meningkat hingga tercapainya kondisi batas cair, daya dukung diprediksi mendekati nol.
3. Terdapat suatu hubungan keterkaitan antara indeks kecairan (LI) dan kuat geser tak teralir (S_u) tanah lempung ekspansif Cikarang, yang dapat didekati dengan persamaan logaritmik.

$$S_u = 76.7\ e^{-3.6(LI)}$$

4. Mengacu pada uji skala utuh yang disimulasikan melalui pendekatan menggunakan elemen hingga, model tanah hiperbolik memberikan hasil yang cukup dekat dengan kondisi aktual, ditinjau dari:
    a. Besarnya penurunan pada beban puncak
    b. Gradien kemiringan kurva tekanan versus deformasi yang ditinjau pada bagian tahap pembebanan dan pelepasan beban
5. Besarnya modulus tersebut dapat dikaitkan dengan kuat geser yang diperoleh dari pengujian in-situ dan rangkaian uji Triaxial UU di laboratorium yang dilakukan pada *undisturbed sample* maupun *bulk sample*. Melalui kelompok data tersebut, dapat diusulkan suatu rentang hubungan kuat geser tak teralir terhadap modulus E_{50} dengan nilai koefisien terendah sebesar 50 S_u hingga terbesar 500 S_u

$$E_{50} = 50 \sim 500\ S_u$$

6. Untuk menentukan besarnya modulus E_{50} melalui kuat geser tak teralir dapat ditentukan dengan mengikutsertakan variabel tegangan keliling total di lapangan σ_3 sebagai faktor normalisasi terhadap modulus, melalui persamaan yang diusulkan berikut:

$$(E_{50} / \sigma_3) = 33.11\ (S_u)^{-1.013}$$

7. Melalui pengukuran tampak suatu potensi terjadinya *heave* atau sembulan pada rongga fondasi akibat penambahan jumlah kadar air. Pada penelitian di masa mendatang, diperlukan pengukuran dengan periode lebih panjang untuk dapat mengakomodasi batasan skala waktu.
8. Proses penjenuhan pada prakteknya dapat terjadi pada dua kondisi, yakni dari bawah (fluktuasi muka air tanah alami) dan dari atas (hujan dan muka

air banjir). Mengacu pada hasil pengembangan yang dilakukan, tampak bahwa besaran parameter potensi pengembangan (tekanan dan deformasi) lebih besar terukur pada mekanisme penjenuhan dari bawah, dan sejalan dengan studi yang mengungkapkan bahwa besarnya potensi pengembangan sejalan dengan besarnya kepadatan kering di lapangan [25]

9. Besarnya potensi pengukuran maksimum diprediksi baru tercapai pada saat peningkatan (*increment*) tekanan pengembangan atau deformasi vertikal mendekati nol akibat suatu penambahan kadar air. Kondisi ini baru dapat ditentukan apabila pengukuran dilakukan dalam jangka waktu yang memadai.

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