

BAB 5

KESIMPULAN DAN SARAN

5.1 Kesimpulan

Dari penelitian ini dapat disimpulkan bahwa:

1. Hasil uji pembebanan fondasi tiang bor aktual terinstrumentasi (dengan *fiber optic*), hasil uji laboratorium, dan hasil analisis numerik secara konsisten menunjukkan bahwa penentuan nilai modulus elastisitas beton dengan persamaan empirik yang selalu bernilai konstan menjadi kurang tepat.
2. Modulus elastisitas beton bernilai konstan pada regangan yang relatif kecil (0 s.d. 150 $\mu\epsilon$ dari data aktual, 0 s.d. 400 $\mu\epsilon$ dari uji laboratorium), namun menjadi bergantung pada besarnya regangan yang terjadi saat regangan yang terjadi besar, tendensinya adalah modulus beton mengecil seiring dengan penambahan regangan.
3. Berdasarkan perhitungan manual modulus beton dan uji laboratorium, persamaan $4700\sqrt{f_c}$ dapat digunakan untuk menghitung nilai modulus beton ketika regangan yang terjadi masih rendah, namun saat regangan besar persamaan empiris tersebut menjadi tidak cocok lagi untuk digunakan karena nilainya akan menjadi lebih tinggi dibandingkan dengan nilai modulus aktual.
4. Perubahan nilai modulus elastisitas beton dapat dijelaskan dengan kurva *stress-strain*. Saat regangan kecil (area elastis) kurvanya lurus artinya nilai modulus elastisitas beton yang merupakan kemiringan garis bernilai konstan, namun saat mulai masuk area plastis, kurvanya melandai dan nilai modulus elastisitas

5. Nilai modulus beton pada fondasi tiang bor tidak homogen di sepanjang tiang. Hal ini disebabkan karena metode konstruksi dan besarnya regangan aksial yang terjadi di setiap kedalaman.
6. Mutu beton pada fondasi tiang bor sangat dipengaruhi oleh metode konstruksi di lapangan, berbeda dengan fondasi tiang pancang yang mutunya dikontrol dengan baik saat proses fabrikasi.
7. Instrumen *fiber optic* dapat digunakan untuk merekam regangan yang terjadi di sepanjang tiang secara kontinu, sehingga kerusakan yang terjadi di kedalaman tertentu dapat terdeteksi melalui besarnya regangan yang meningkat secara drastis.

5.2 Saran

Berikut beberapa saran untuk penelitian lebih lanjut.

1. Kabel *fiber optic* dipasang pada empat sisi sampel beton agar perubahan regangan dapat terukur dengan lebih teliti.
2. Perlu dipertimbangkan aplikasi dari hasil penelitian di laboratorium yang menyatakan bahwa nilai modulus berubah seiring dengan perubahan regangan hubungannya dengan proses desain fondasi tiang bor.

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