

# Studi Perbaikan Sambungan Spun Pile-Pile Cap Menggunakan Fiber Reinforced Polymer (FRP) Tipe Rod Dengan Pembebanan Siklik Arah Lateral = Repair of Spun Pile-Pile Cap Connection Using Rod Type Fiber Reinforced Polymer (FRP) Due To Lateral Cyclic Loading

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## Abstrak

Performance-based design (PBD) untuk struktur bawah belum diperbolehkan di Indonesia karena terdapat syarat yang harus dipenuhi, yaitu limited ductility dan repairable. Definisi dari repairable sendiri belum dijelaskan secara detail sehingga diperlukan penelitian lebih lanjut mengenai maknanya. Penelitian perbaikan dilakukan terhadap benda uji sambungan spun pile terhadap pile cap yang sudah rusak parah dan diperbaiki menggunakan fiber reinforced polymer (FRP) berupa FRP rod dan FRP wrap. Pengujian dilakukan untuk spun pile dengan beton pengisi yang diperbaiki dengan sepuluh buah FRP rod dan dua lapis FRP wrap. Parameter yang dilihat dalam menentukan perilaku dan efektivitas perbaikan adalah kekuatan, daktilitas, energi disipasi, momen rotasi, degradasi kekakuan, dan degradasi kekuatan. Hasil penelitian menunjukkan bahwa benda uji mampu kembali ke kondisi awal dengan adanya penurunan kekuatan. Damage index dan performance levels juga dianalisa untuk eksperimen dan setiap model yang dibuat. Berdasarkan hal tersebut, dapat diketahui bahwa jumlah FRP rod yang digunakan dan kondisi awal benda uji sebelum perbaikan akan mempengaruhi efektivitas perbaikan yang dilakukan. Model dengan kondisi awal sebelum perbaikan berupa serviceable dan repairable berdasarkan damage index, memberikan perbaikan yang paling efektif untuk kembali ke kondisi awal sambungan spun pile terhadap pile cap sebelum mengalami kerusakan.

.....Performance-based design (PBD) is not allowed for lower structures in Indonesia because there are conditions that must be met, namely limited ductility and repairability. The definition of repairable itself has not been explained in detail so further research is needed on its meaning. Repair research was carried out on test specimens for spun pile connections to pile caps that were severely damaged and repaired using fiber reinforced polymer (FRP) in the form of FRP rods and FRP wrap. Tests were carried out for spun piles with infill concrete repaired with ten FRP rods and two layers of FRP wrap. Parameters considered in determining the behavior and effectiveness of repairs are strength, ductility, energy dissipation, rotational moment, stiffness degradation, and strength degradation. The results showed that the test object was able to return to its initial condition with a decrease in strength. Damage index and performance levels were also analyzed for the experiment and each model was created. Based on this, it can be seen that the number of FRP rods used and the initial condition of the test object before a repair will affect the effectiveness of the repairs carried out. The model with the initial conditions before repair in the form of serviceable and repairable based on the damage index provides the most effective repair to return to the initial condition of the spun pile-pile cap connection before it was damaged