

Studi Perilaku Sambungan Spun Pile-Pile Cap Tanpa Beton Pengisi Dengan Perkuatan Steel Jacketing Akibat Pembebanan Siklik = Behavior of Spun Pile-to-Pile Cap Connection without Concrete Infill with Additional Steel Jacketing Due to Cyclic Loading

Stevany Lydia Jedidjah Hugén, author

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Abstrak

Praktik fondasi di Indonesia masih berada pada tahap linear elastis dengan batas displacement yang disyaratkan hanya sebesar 25 mm oleh SNI 8460:2017. Hal ini mengakibatkan desain fondasi di Indonesia tidak efisien dan dianggap boros karena berukuran besar dan berjumlah banyak agar fondasi dapat tetap berperilaku elastis. Jumlah tulangan spiral pada praktik spun pile di Indonesia masih berada di bawah persyaratan minimum ACI 318-19. Dibutuhkan banyak confinement dengan jarak yang rapat untuk mengatasi masalah tersebut. Namun, hal tersebut dinilai kurang ekonomis. Oleh karena itu, dilakukan studi eksperimen untuk mengetahui perilaku sambungan spun pile-pile cap dengan perkuatan steel jacketing dengan pembebanan siklik lalu dibandingkan dengan monotonic pushover analysis pada software Opensees. Pengujian dan permodelan dilakukan pada dua spun pile berdiameter 500 mm yang diselubungi steel jacketing yaitu dengan beton pengisi dan tanpa beton pengisi. Hasil pengujian eksperimen dan permodelan ini berupa kurva histeretik yang akan dianalisis untuk mendapatkan daktilitas, energi disipasi, degradasi kekuatan, degradasi kekakuan, overstrength ratio, dan momen rotasi. Pembebanan siklik yang diberikan mengikuti ACI 374.2r. Pemberian steel jacketing meningkatkan kekakuan, kekuatan, energi disipasi dan overstrength ratio, namun menurunkan daktilitas, serta memindahkan area terjadinya sendi plastis. Pemberian beton pengisi meningkatkan overstrength ratio, namun menurunkan daktilitas, kekakuan, kekuatan, dan energi disipasi.

.....The practice of foundations in Indonesia is still at the elastic stage with the displacement limit is only 25 mm required by SNI 8460:2017. Thus, design of foundation in Indonesia become inefficient and considered wasteful because of large sizes and in large quantities to keep the foundation remain elastic. The amount of confinement in the practice of spun piles in Indonesia is still below the minimum requirements of ACI 318-19. It takes a lot of confinement with tight distance to overcome this problem. However, it is considered less economical. Therefore, an experimental study was conducted to determine the behavior of the spun pile-pile cap connection with steel jacketing reinforcement with cyclic loading and then compared with monotonic pushover analysis on Opensees. The research and modelling were carried out on two objects of 500mm diameter spun pile covered with steel jacketing, namely with concrete infill and without concrete infill to determine the effect of concrete infill on the spun pile-pile cap. The results of this research and modelling are hysteretic curve that provides several research parameters, which are ductility, energy dissipation, strength degradation, stiffness degradation, overstrength ratio, and moment rotation. The cyclic loading applied is following ACI 374.2r. The use of additional steel jacketing results in increasing stiffness, strength, energy dissipation, overstrength ratio, reduction of ductility and moving the area where plastic hinges occur. The use of concrete infill results in increasing overstrength ratio and reduction of ductility, stiffness, strength, and energy dissipation.