

Studi perilaku sambungan spun pile-pile cap dengan pengisi beton bertulang akibat pembebanan siklik = Behaviour of spun pile-to-pile cap connection with reinforced concrete infill due to cyclic loading

Alfetra Henoeh Tandita, author

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Abstrak

Praktik sambungan spun pile terhadap pile cap di Indonesia pada umumnya ialah berupa pemberian pengisi beton bertulang di bagian hollow spun pile hingga kedalaman kurang lebih 1 meter. Tujuannya ialah untuk memastikan sendi plastis terjadi pada area tersebut dan meningkatkan kemampuan struktur dalam berdeformasi secara inelastis. Namun, analisis yang dilakukan terhadap fondasi masih berada di tahap linear elastis dan batas displacement yang disyaratkan oleh SNI 8460:2017 hanya sebesar 25 mm. Akibatnya, diperlukan jumlah dan ukuran fondasi yang besar supaya fondasi tetap berperilaku elastis. Oleh karena itu, dilakukan studi eksperimen pada spun pile dengan pembebanan siklik lalu dibandingkan dengan pushover analysis pada software finite element ABAQUS untuk mengetahui kapasitas struktur pada fase non linear plastis. Terdapat 2 benda uji berupa spun pile dengan diameter 450 mm yang diberikan pengisi beton bertulang dan salah satu benda uji diberikan pengisi beton non shrinkage mutu tinggi 54 MPa. Hasil permodelan ABAQUS menunjukkan bahwa idealnya beton non shrinkage mutu tinggi akan meningkatkan seluruh parameter penelitian. Namun, berdasarkan hasil eksperimen, didapat bahwa beton non shrinkage mutu tinggi tidak memberikan dampak yang signifikan untuk seluruh parameter penelitian, yaitu daktilitas, energi disipasi, degradasi kekuatan, degradasi kekakuan, overstrength ratio, ketahanan lateral, kapasitas geser dan kapasitas bending.

.....The practice of spun pile to pile cap connections in Indonesia is by giving reinforced infilling concrete in the hollow spun pile to a depth of approximately 1 meter. The purpose of giving the infilling concrete is to ensure that the plastic hinge occurs nearly below the connection and increase the ability of the structure to deform inelastically. However, the analysis carried out on the foundation is still at the linear elastic stage and the lateral displacement limit required by SNI 8460:2017 is only 25 mm. As the result, a large number and size of foundations are required to keep the foundation remain elastic. Therefore, an experimental study was conducted on spun piles under cyclic loading and then compared with pushover analysis on the ABAQUS finite element software to determine the capacity of the structure in the non-linear plastic phase. There are 2 specimens of 450 mm diameter spun pile: common practice and high-strength non-shrinkage infilling concrete. The results of the ABAQUS modeling show that high-strength non-shrinkage concrete will ideally improve all the parameters of the study. However, the testing results show that the high-strength non-shrinkage concrete did not have a significant effect on all research parameters, which are ductility, energy dissipation, strength degradation, stiffness degradation, overstrength ratio, lateral resistance, shear capacity and bending capacity.