

Studi Peforma Sambungan Spun Pile ? Pile Cap dengan Perkuatan Steel Jacketing dengan Software ABAQUS = Study of Spun Pile – Pile Cap Connection Performance with Steel Jacketing Retrofitting using ABAQUS Software

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Abstrak

Studi numerikal dan parametrik dilakukan menggunakan ABAQUS pada sambungan spun pile - pile cap dengan beton pengisi bertulang serta perkuatan steel jacketing untuk menganalisis efektivitas confinement oleh steel jacketing. Studi eksperimen yang sebelumnya sudah dilakukan menunjukkan steel jacketing masih belum mampu menghindari fenomena pinching dan tidak meningkatkan daktilitas secara signifikan. Efek confinement oleh steel jacketing akan ditinjau berdasarkan penurunan tegangan pada sengkang spun pile dan kenaikan kuat tekan beton inti spun pile. Studi parametrik dengan parameter koefisien friksi, tebal dan tinggi steel jacketing, serta beban aksial dilakukan untuk mendapatkan desain efektif dari perkuatan steel jacketing. Hasil pemodelan menunjukkan bahwa penggunaan steel jacketing mampu memberikan efek confinement yang baik melalui penurunan stress development yang terjadi pada sengkang spun pile dan peningkatan beton inti spun pile. Desain efektif perkuatan steel jacketing yang disarankan adalah menggunakan zinalume tebal 1 mm dan tinggi $1,5D < H < 2D$ dimana D adalah diameter spun pile, untuk menghindari terjadinya local buckling pada zinalume.

.....Numerical and parametric study was conducted using ABAQUS on a spun pile – pile cap connection filled with concrete reinforcement and steel jacket retrofitting to analyse the effectiveness of confinement by steel jacketing. Experimental study that has been conducted before shown that steel jacketing retrofitting wasn't able to avoid pinching and didn't significantly increase ductility. Confinement effect by steel jacket will be viewed based on the degradation of stress developed on spun pile's stirrups and the enhancement of spun pile's core concrete strength. Parametric study consisting of friction coefficient, thickness and height of steel jacketing, and axial load was conducted to achieve an effective design of steel jacket retrofitting. Modelling results shown that the use of steel jacket retrofitting was able to provide good confinement by reducing the stress development that occur on the spun pile's stirrups as well as enhancement in spun pile's core concrete strength. An effective design of steel jacketing retrofitting that was suggested is using a 1 mm in thickness zinalume and height of $1,5D < H < 2D$, where D is the diameter of spun pile, to avoid local buckling on the zinalume.