Analisa numerik pengaruh retaining structure terhadap prilaku pile raft pada konstruksi basement studi kasus proyek world trade center 3 Jakarta Indonesia = Numerical analysis of retaining structure effect to the behaviour of pile ratf in basement construction case study project world trade center 3 Jakarta Indonesia

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Abstrak

Proyek pembangunan world trade center 3 (WTC 3) menggunakan pondasi pile raft lengkap dengan 5 lantai basement dan retaining structure yang mengelilinginya berupa secant pile dia. 800 mm untuk menopang 44 lantai bangunan tower serta 4 lantai podium, desain pondasi pile raft tersebut belum meperhitungkan keberadaan retaining structure serta kekakuan dari konstruksi basement. Sejatinya pondasi pile raft, retaining structure & element struktur basement terintegrasi dan bekerja secara bersama-sama dalam meneruskan beban struktur atas ke masa tanah dibawah pondasi.
Pada penelitian ini telah dilakukan pengujian melalui analisa numerik dengan menggunakan software GTS Midas terhadap sejumlah model dan ditemukan bahwa keberadaan retaining structure dan elemen struktur basement dapat mengurangi settlement (maksimum settlement serta differential settlement) dan internal force (bending moment & shear force) yang terjadi pada pondasi pile raft melalui mekanisme pengekangan ujung raft dan masa tanah dibawah raft serta transfer beban vertikal dari raft ke retaining structure sehingga sebagin beban vertikal dipikul oleh retaining structure. Efek pengekangan dan mekanisme transfer beban retaining structure dapat bekerja efektif pada rasio Dw/Dt < 1.3 serta pada sistem pondasi partially pile raft.
<hr>The construction of world trade center 3 (WTC 3) project are using pile raft as a foudation to support 44 floors of tower building and 4 floors of podium building. This foundation is integrated with five floors of basement and retaining structure. The type of retaining structure used is secant pile with 800 mm diameter in which the position of retaining structure lies on the circumferences of the basement. The original design of the pile raft foundation are not consider the existence of retaining structure and the structural element stiffness of basement likes column, beam etc. In fact that pile raft, basement element structure and retaining structure are integrated and working together in transfer load from upper structucture to soil.
In this reasearch it was examine a number of model with numerical analysis using GTS midas software and it was known that the interaction of retaining structure and basement element structure can reduce settlement (Maximum settlement and differential settlement) and internal force (bending moment & shear force) on pile raft foundation by two mechanism. The first mechanism is the retaining structure and basement element structure can restraining the end of raft and the second mechanis is vertical load transfer from raft to retaining structure. Both of the mechanisms are effective for rasio Dw/Dt less than 1.3 and for partially pile raft.