



INTISARI

Pekerjaan fondasi dirancang dan dikerjakan paling awal pada seluruh proyek pembangunan yang harus disesuaikan dengan kondisi tanah dan beban desain struktur atas. Proyek pembangunan gedung auditorium terdapat 17 jenis *pile-cap* yang dengan ukuran bervariasi. Letak *pile-cap* yang dianalisis ditentukan berdasarkan total beban aksial kolom terbesar, serta letak tiang dalam *pile-cap* disesuaikan dengan distribusi beban terbesar. Tanah area proyek pembangunan didominasi oleh tanah pasir dan sedikit kelanauan dengan kedalaman muka air yang relatif dangkal.

Pada proyek pembangunan gedung auditorium, struktur atas yang dikerjakan tidak sesuai dengan desain awal ketika fondasi dirancang, sehingga terdapat perbedaan beban desain struktur atasnya. Oleh karena itu, penelitian dilakukan untuk melakukan analisis evaluasi pada fondasi untuk mengetahui perilaku tiang tunggal dan kelompok tiang dalam menahan beban struktur yang baru. Selain itu, karakteristik tanah pada proyek pembangunan perlu ditinjau potensi likuefaksi. Apabila potensi likuefaksi tinggi, dilakukan analisis fondasi tiang akibat pengaruh likuefaksi. Kemudian, dilakukan redesain fondasi tiang bor yang ditinjau berdasarkan hasil analisis evaluasi fondasi serta pengaruh adanya likuefaksi. Nilai kapasitas dukung dan penurunan tiang tunggal secara empiris akan dibandingkan dengan beban uji tiang, yaitu PDA, SLT, ataupun LLT untuk memverifikasi perhitungan. Hasil kapasitas dukung dibandingkan dengan beban untuk mengetahui keamanannya, sedangkan hasil perilaku tiang akan dilakukan pengecekan terhadap nilai izinnnya. Redesain tiang yang dilakukan ada dua alternatif, yaitu alternatif tiang pada kondisi normal dan alternatif tiang akibat pengaruh likuefaksi.

Hasil analisis likuefaksi menyimpulkan bahwa potensi likuefaksi tinggi, sehingga perlu dilakukan analisis fondasi akibat pengaruh likuefaksi. Hasil analisis tersebut menyimpulkan bahwa beberapa tiang tidak aman, sehingga perlu dilakukan redesain untuk meningkatkan keamanan dan kapasitas tiang. Hasil evaluasi fondasi menyimpulkan bahwa fondasi tiang masih tetap aman dalam menahan beban desain baru, sehingga perlu dilakukan redesain untuk mengurangi pemborosan dan mengoptimalkan fungsi dari fondasi. Dengan demikian, terdapat dua alternatif tiang yang berbeda berdasarkan dua tinjauan evaluasi.

Kata kunci: fondasi tiang bor, likuefaksi, kapasitas dukung, perilaku tiang, redesain



ABSTRACT

Foundation work is designed and carried out at the earliest in all development projects that must be adapted to the soil conditions and the design load of the superstructure. The auditorium building construction project has 17 types of pile-caps with varying sizes. The location of the analyzed pile-cap is determined based on the total axial load of the largest column, and the location of the pile in the pile-cap is adjusted to the distribution of the largest load. The soil of the development project area is dominated by sandy soil and a little erosion with a relatively shallow water surface depth.

In the auditorium building construction project, the superstructure that was worked on was not in accordance with the initial design when the foundation was designed, so there was a difference in the design load of the upper structure. Therefore, the study was conducted to conduct an evaluation analysis on the foundation to determine the behavior of single pillars and groups of pillars in bearing the load of the new structure. In addition, the characteristics of the soil in the development project need to be reviewed for liquefaction potential. If the liquefaction potential is high, an analysis of the pile foundation due to the influence of liquefaction is carried out. Then, a redesign of the drill pile foundation was carried out which was reviewed based on the results of the foundation evaluation analysis and the influence of liquefaction. The value of the supporting capacity and lowering of a single pole will be empirically compared to the pole test load, i.e. PDA, SLT, or LLT to verify the calculation. The results of the supporting capacity are compared to the load to determine its safety, while the results of the behavior of the pole will be checked against the value of the permit. There are two alternatives to the pole redesign carried out, namely the alternative pole under normal conditions and the alternative pole due to the influence of liquefaction.

The results of liquefaction analysis concluded that the potential for liquefaction was high, so it was necessary to conduct a foundation analysis due to the influence of liquefaction. The results of the analysis concluded that some poles were unsafe, so it was necessary to redesign to increase the safety and capacity of the poles. The results of the foundation evaluation concluded that the pile foundation is still safe in bearing the weight of the new design, so it is necessary to redesign to reduce waste and optimize the function of the foundation. Thus, there are two different pole alternatives based on two evaluation reviews.

Keywords: *drill pile foundation, liquefaction, bearing capacity, pile behavior, redesign*