

## INTISARI

Pemerintah sedang membangun jalur ganda kereta api lintas selatan Kroya-Kutoarjo untuk melayani permintaan perjalanan kereta api yang semakin meningkat. Desain awal fondasi tiang bor BH (Bangunan Hubung) 1832 yang berada di jalur tersebut mempunyai diameter 0,8 meter. Di *abutment*-1 (ABT-1) dan *abutment*-2 (ABT-2), jumlah tiang bor yang digunakan adalah 6 buah dan panjangnya 31 meter, sedangkan di *pier*-1 (P-1) jumlahnya 9 buah dan panjangnya 23 meter. Hasil penyelidikan tanah terbaru menunjukkan bahwa terdapat lempung sangat lunak ( $N-SPT = 1$ ) pada kedalaman 14 – 30 meter di ABT-1, 6 – 22 meter di P-1, dan 12 – 22 meter di ABT-2. Berdasarkan data tersebut, dicurigai desain awal fondasi tiang bor tidak mampu menahan gaya-gaya yang bekerja, sehingga perlu dilakukan evaluasi.

Evaluasi dilakukan dengan memeriksa ulang beban-beban yang bekerja dan kapasitas dukung tiang bor di ABT-1, P-1, dan ABT-2. Apabila beban yang bekerja lebih besar daripada kapasitas dukung tiang, maka jumlah, panjang, dan konfigurasi tiang didesain ulang. Desain awal tulangan tiang bor juga diperiksa kecukupannya dalam menahan beban yang bekerja.

Hasil evaluasi menunjukkan bahwa kapasitas desain awal lebih kecil daripada beban yang bekerja. Jumlah tiang bor di ABT-1 dan ABT-2 perlu ditambah menjadi 11 buah dengan panjang 44 meter di ABT-1 dan 42 meter di ABT-2. Tiang bor di P-1 hanya perlu diperpanjang menjadi 38 meter. Tulangan tiang bor memenuhi persyaratan.

**Kata kunci:** fondasi tiang bor, jembatan kereta, desain ulang

## ABSTRACT

*Due to high demand of train travel, the government build a double-track railway on the south lane of Kroya-Kutoarjo. The initial design of the drilled shafts BH (Bangunan Hubung) 1832 on this track has a diameter of 0.8 meters. This design used 6 drilled shafts with 31 meters of length on abutment-1 (ABT-1) and abutment-2 (ABT-2) while 9 drilled shafts with 23 meters of length are used on pier-1 (P-1). The recent soil investigation result showed that there was a very soft clay (N-SPT = 1) at 14-30 meters depth on ABT-1, 6- 22 meters depth on P-1, and 12-22 meters depth on ABT-2. Based on these data, the initial design of the drilled shafts suspected to not be able to withstand the acting force, therefore it needs to be evaluated.*

*Evaluation was carried out by re-checking the working loads and the bearing capacity of the drilled shafts on ABT-1, P-1, and ABT-2. If the working load is greater than the bearing capacity of the shafts, then the number, length and configuration of the shafts will be redesigned. The initial design of the steel reinforcement also will be examined for its adequacy in order to resist the working load.*

*The result shows that the initial design of the drilled shafts has a smaller capacity than the working loads. The drilled shafts on ABT-1 and ABT-2 needs to be added to 11 pieces with 44 meters length on ABT-1 and 42 meters length in ABT-2. The drilled shafts on P-1 only needs to be extended to 38 meters. The steel reinforcement complies the requirements.*

**Keywords:** *drill shafts, railway bridge, redesign*