

INTISARI

Simpang Joglo merupakan simpang dengan 7 ruas jalan raya dimana terdapat jalur kereta api Solo Balapan-Kadipiro ditengahnya. Pembangunan *elevated rail* Simpang Joglo dilakukan untuk mengatasi tingginya tingkat perjalanan kereta api dimana terdapat jembatan komposit pipa rangka baja sepanjang 273,4 m serta tinggi konstruksi 30 m. Pemilihan metode *erection* dilakukan per-segment dengan penambahan perkuatan RO-RO *shoring system* dan *temporary bracing* untuk menjaga stabilitas jembatan selama proses *erection*.

Berdasarkan analisis, RO-RO Shoring System memiliki SF 2,6 dan 2,05 berturut-turut dengan metode pembebanan DKI dan DFBK nilai SF yang disyaratkan adalah $\geq 2,0$ sesuai dengan arahan KKJTJ. Mengacu SNI 1729 2020 nilai rasio kapasitas harus bernilai $\leq 1,0$ untuk struktur dikatakan aman. Dengan metode pembebanan DKI, *cross beam* 1-4 memiliki rasio kapasitas lentur berturut-turut adalah 0,389 ; 0,297 ; 0,135 ; 0,084 , rasio kapasitas geser 0,477 ; 0,242 ; 0,314 ; 0,222. Kaki shoring memiliki rasio kapasitas lentur 0,021 dan rasio kapasitas tekan aksial 0,5. Dengan metode pembebanan DFBK *cross beam* 1-4 memiliki rasio kapasitas lentur berturut-turut adalah 0,361 ; 0,335 ; 0,153 ; 0,094 serta rasio kapasitas geser 0,441 ; 0,308 ; 0,354 ; 0,248. Kaki shoring memiliki rasio kapasitas lentur 0,029 dan rasio kapasitas tekan aksial 0,7.

Nilai deformasi lateral tanpa penambahan *temporary bracing* 130,12 mm. Batas deformasi ijin yaitu 41,67 mm mengacu pada standar AISC, sehingga dapat menyebabkan guling jembatan. Dengan *temporary bracing* deformasi lateral yang terjadi adalah 5,29 mm, nilai deformasi dibawah batas ijin, sehingga *temporary bracing* mampu mengatasi guling material jembatan. Nilai R_{max} tanpa *temporary bracing* 0,31 dan dengan *temporary bracing* adalah 0,13. Kontrol stabilitas *temporary bracing* menggunakan metode pembebanan DFBK menghasilkan nilai R_{max} 0,19 ,rasio kapasitas lentur 0,14 , rasio kapasitas geser 0,005 dan rasio kapasitas tekan aksial 0,15. Dengan metode pembebanan DKI nilai R_{max} 0,13 ,rasio kapasitas lentur 0,04 , rasio kapasitas geser 0,002 dan rasio kapasitas tekan aksial 0,08.

Kata kunci : RO-RO *Shoring*, *Temporary Bracing*, Guling, DKI, DFBK

ABSTRACT

Simpang Joglo is an intersection with 7 highways where there is a Solo Balapan-Kadipiro railway line in the middle. The construction of the Simpang Joglo elevated rail was carried out to overcome the high level of train travel where there is a steel frame pipe composite bridge with a length of 273.4 m and a construction height of 30 m. The selection of the erection method was carried out by segmentation with the addition of RO-RO shoring system reinforcement and temporary bracing to maintain the stability of the bridge during the erection process.

Based on the analysis, the RO-RO Shoring System has an SF of 2.6 and 2.05 respectively with the DKI and DFBK loading method the required SF value is ≥ 2.0 according to the KKJTJ directives. Referring to SNI 1729 2020 the value of the capacity ratio must be ≤ 1.0 for the structure to be said to be safe. With the DKI loading method, cross beams 1-4 have a flexural capacity ratio of 0.389; 0.297 ; 0.135 ; 0.084 , shear capacity ratio 0.477 ; 0.242 ; 0.314 ; 0.222. The shoring leg has a flexural capacity ratio of 0.021 and an axial compression capacity ratio of 0.5. With the DFBK cross beam 1-4 loading method, the flexural capacity ratios respectively are 0.361 ; 0.335 0.153 ; 0.094 and shear capacity ratio 0.441 ; 0.308 ; 0.354 ; 0.248. The shoring leg has a flexural capacity ratio of 0.029 and an axial compression capacity ratio of 0.7.

The value of lateral deformation without the addition of temporary bracing is 130.12 mm. The allowable deformation limit is 41.67 mm according to the AISC standard, so that it can cause overturning of the bridge. With temporary bracing, the lateral deformation that occurs is 5.29 mm, the deformation value is below the allowable limit, so that the temporary bracing is able to overcome overturning of the bridge material. The R_{max} value without temporary bracing is 0.31 and with temporary bracing is 0.13. Stability control of temporary bracing using the DFBK loading method resulted in an R_{max} value of 0.19, a flexural capacity ratio of 0.14, a shear capacity ratio of 0.005 and an axial compression capacity ratio of 0.15. With the DKI loading method, the R_{max} value is 0.13, the flexural capacity ratio is 0.04, the shear capacity ratio is 0.002 and the axial compression capacity ratio is 0.08.

Keyword : RO-RO Shoring, Temporary Bracing, Overturning, DKI, DFBK