

Tahapan konstruksi yang dilakukan pada struktur rangka atap Zona B Gedung GIK UGM dapat mengakibatkan perbedaan gaya dalam (aksial) antara desain dan pelaksanaan di lapangan. Perbedaan ini disebabkan oleh distribusi beban mati struktural yang berbeda, dimana analisis pada tahap desain mengasumsikan struktur rangka atap telah selesai dibangun dengan beban mati struktural terdistribusi secara merata, sementara pada tahap pelaksanaan di lapangan, struktur yang sudah terpasang menjadi penopang bagi komponen-komponen yang akan disambung berikutnya, sehingga komponen tersebut seharusnya tidak menerima beban mati struktur yang sudah terpasang sebelumnya.

Untuk mengevaluasi dampak dari tahapan konstruksi terhadap gaya aksial, dilakukan analisis pada dua model desain: Model Atap dan Bangunan dan Model Atap Terpisah. Kedua model tersebut kemudian dibandingkan dengan model realisasi di lapangan, yakni Model Tahapan Konstruksi Atap. Pemodelan realisasi di lapangan dibuat dengan pendekatan yang mengacu pada perilaku struktur akibat tahapan konstruksi di lapangan.

Hasil analisis rangka atap menunjukkan bahwa Model Atap dan Bangunan menghasilkan perbedaan gaya aksial mencapai 72,38 kN, sedangkan secara rasio perbedaan mencapai 65,95% dari realisasinya di lapangan. Sementara itu, Model Atap Terpisah menghasilkan perbedaan gaya aksial mencapai 424,14 kN, sedangkan secara rasio perbedaan mencapai 126,90% dari realisasi di lapangan. Secara keseluruhan, Model Atap dan Bangunan menghasilkan rerata perbedaan gaya aksial sebesar 3,18 kN, dengan Rangka Utama dan Rangka Pengaku cenderung menerima gaya aksial yang lebih kecil, sementara Rangka Pembagi menerima gaya aksial yang cenderung lebih besar dari realisasi di lapangan. Sementara itu, Model Atap Terpisah menghasilkan rerata perbedaan gaya aksial sebesar 16,44 kN, dengan sebagian besar batang dari ketiga kelompok rangka atap tersebut cenderung menerima gaya aksial yang lebih tinggi daripada realisasinya di lapangan.

Kata kunci: rangka atap, gaya dalam, tahapan konstruksi

ABSTRACT

The construction sequential performed on the roof truss structure of Zone B of the GIK UGM Building can result in differences in internal forces (axial) between the design and implementation in the field. These differences are caused by varying distributions of dead structural loads, where the design analysis assumes that the roof truss structure has been completed with the dead structural loads evenly distributed. However, during the construction sequential in the field, the installed structure serves as a support for the subsequent connecting components, hence these components should not bear the dead structural loads already installed.

To evaluate the impact of construction stages on axial forces, an analysis was conducted on two design models: the Integrated Roof with Building Model and the Separate Roof Model. Both models were then compared with a field realization model, namely the Roof Construction Stage Model. The field realization modeling was made with a design approach considering the structural behavior due to construction sequential in the field.

The analysis results of the roof truss showed that the Integrated Roof and Building Model yielded axial force differences of up to 72.38 kN, whilst in terms of ratio the axial force differences of up to 65,95% compared to the field realization. The analysis results for the Separate Roof Model yielded differences of up to 424.14 kN, whilst in terms of ratio the axial force differences of up to 126.90% compared to the field realization. Overall, the Integrated Roof and Building Model produced an average axial force difference of 3.18 kN, with the Main Truss and Brace Truss tending to receive smaller axial forces, while the Dealer Truss tended to receive larger axial forces compared to the field realization. Meanwhile, the Separate Roof Model resulted in an average axial force difference of 16.44 kN, with most members of the three roof truss groups tend to receive higher axial forces than their realization in the field.

Keywords: roof truss, internal force, construction sequential