

Simpang Joglo merupakan salah satu titik kemacetan di Kota Surakarta. Pada simpang ini, terdapat perlintasan sebidang yang melintasi bundaran di tengah simpang. Berdasarkan kondisi tersebut, dilakukan pembangunan Jalur Kereta Api Kalioso – Solo Balapan dengan menggunakan *elevated track*. Pada penelitian ini, dilakukan analisis terkait panjang antrean, waktu tempuh, tundaan, kinerja simpang, serta kerugian biaya bahan bakar akibat tundaan pada skenario tanpa rekayasa dan skenario *elevated railway*.

Panjang antrean, waktu tempuh, dan tundaan dihitung dengan memodelkan kondisi asli pada Simpang Joglo menggunakan software PTV VISSIM. Setelah dilakukan pemodelan pada perangkat lunak VISSIM, dilakukan validasi untuk memastikan model Simpang Joglo sudah sesuai dengan kondisi eksisting. Apabila nilai validasi tidak memenuhi, maka akan dilakukan kalibrasi terkait perilaku pengendara di Simpang Joglo. Hasil simulasi pada perangkat lunak VISSIM akan diolah dengan Excel dan digunakan untuk menganalisis kinerja pada Simpang Joglo.

Hasil analisis menunjukkan total panjang antrean akibat ditutupnya palang kereta pada skenario tanpa rekayasa mengalami penurunan sebesar 77% setelah dilakukan pembangunan *elevated railway*. Rata-rata waktu tempuh pada skenario tanpa rekayasa juga mengalami penurunan sebesar 78% setelah pembangunan *elevated railway*. Tingkat pelayanan pada skenario tanpa rekayasa adalah pada tingkat F sedangkan tingkat pelayanan simpang pada skenario *elevated railway* naik ke tingkat B. Dilakukan perhitungan masa layan terkait tingkat pelayanan simpang yang dapat difasilitasi *elevated railway* dimana dibutuhkan sembilan (9) tahun untuk tingkat pelayanan Simpang Joglo kembali ke kondisi sebelum pembangunan proyek. Pada skenario tanpa rekayasa, biaya konsumsi bahan bakar akibat tundaan sebesar kurang lebih 372 juta rupiah per tahun sedangkan pada skenario *elevated railway* biaya tersebut turun menjadi sekitar 30 juta rupiah.

Kata kunci: Simpang Joglo, *Elevated Railway*, Waktu Tempuh, Tundaan, Panjang Antrean

ABSTRACT

Joglo Intersection is one of the main congestion points in Surakarta City. In this intersection, there is one level crossing that traverses upon the roundabout in the middle of the intersection. Based on these conditions, the Kalioso – Solo Balapan railway is constructed using elevated track. In this research, queue length, travel time, delays, and vehicle fuel use cost loss due to vehicle delays will be calculated in do nothing scenario and elevated railway scenario.

Queue length, travel time, and delays will be calculated through PTV VISSIM modeling. After modeling using PTV VISSIM software, validation of the Joglo Intersection will be conducted to make sure that the Joglo Intersection model is already suitable for existing condition. If the validation values do not match the standard, calibration related to driving behavior will be conducted. Simulation results on VISSIM software will be processed with Excel and used to analyze Joglo Intersection performance.

The analysis results show that the total queue length due to the closed railway barrier in the do nothing scenario decreased by 77% after the elevated railway was constructed. Average travel time in the do nothing scenario also decreased by 78% after the elevated railway was constructed. The intersection service level in the do nothing scenario is defined by F while the intersection service level in the elevated railway scenario is defined by B. The service period of the elevated railway is calculated so that it is concluded that the service period of the elevated railway is nine (9) years before intersection performance is back to the origin state. In the do nothing scenario, vehicle fuel use cost due to vehicle delays is approximately 372 million rupiah in a year while in the elevated railway scenario, the cost decreased to about 30 million rupiah in a year.

Keywords: Joglo Intersection, Elevated Railway, Travel Time, Delays, Queue Length