ABSTRAK

Persaingan bidang teknologi yang pesat serta meningkatnya angka pertumbuhan dan mobilitas masyarakat khususnya dibidang tranportasi merupakan faktor inti yang mempengaruhi sistem kinerja lalu lintas, sehingga menumpuknya volume kendaraan atau kemacetan. Sebagaimana kasus kemacetan pada simpang empat bersinyal Gemangan, Sleman, Yogyakarta. Sistem pelayanan sinyal pada simpang tersebut masih menggunakan cara manual searah jarum jam. Penelitian ini bertujuan untuk menganalisa, mengevaluasi, dan memodelkan sebagaimana kinerja pada simpang tersebut. Metode yang digunakan dalam mengkaji permasalahan ini dengan pedoman Manual Kapasitas Jalan Indonesia 1997 dan pemodelan *software PTV VISSIM Student Version,* data yang digunakan yaitu volume jam puncak. Hasil analisis metode MKJI 1997 kondisi eksisting yaitu nilai arus lalu lintas total (Qtot) = 3101 smp/jam, derajat kejenuhan (DS) = 1,025, panjang antrian (*QL*) = 326 meter, tundaan (D) = 271 det/smp. Hasil pemodelan *software PTV VISSIM* kondisi eksisting yaitu panjang antrian (*Qlen*) = 143,5 meter, tundaan (*VEHdelay)* = 170,0 detik, dan tingkat pelayanan (*Level of Service)* = LOS F atau sangat buruk. Dengan hasil kondisi eksisting tersebut maka direncanakan alternatif guna memperbaiki kinerja simpang yaitu alternatif 1 perancangan ulang waktu siklus dan alternatif 2 penambahan lebar efektif dan perancangan ulang waktu siklus. Perencanaan alternatif tersebut diterapkan pada kedua acuan MKJI 1997 dan *PTV VISSIM.*

Kata kunci: simpang bersinyal, kinerja simpang, tingkat pelayanan, MKJI 1997, *PTV VISSIM*

ABSTRACT

The growing competition in the field of technology and increasing numbers of growth and mobility of the people, especially in the field of transportation, are core factors that affect traffic performance systems, resulting in the accumulation of vehicle volumes or congestion. As is the case with traffic jams at the intersection of the signaled Gemangan, Sleman, Yogyakarta. The signal service system at the intersection is still using the clockwise method manually. This study aims to analyze, evaluate, and model the performance of the intersection. The method used in assessing this problem with the 1997 Indonesian Road Capacity Manual and modeling of the VISSIM Student Version PTV software, the data used is peak hour volume. The results of the 1997 MKJI method analysis of existing conditions are the value of total traffic flow (Qtot) = 3101 smp / hour, degree of saturation (DS) = 1.025, queue length (QL) = 326 meters, delay (D) = 271 sec / smp. The results of VISSIM PTV software modeling in the existing conditions are queue length (Qlen) = 143.5 meters, delay (VEHdelay) = 170.0 seconds, and service level (Level of Service) = LOS F or very bad. With the results of the existing conditions, an alternative plan is planned to improve the performance of the intersection, namely alternative 1 cycle time redesign and alternative 2 effective width addition and cycle time redesign. Alternative planning is applied to both the 1997 MKJI references and PTV VISSIM.

Key words : signalized intersections, intersections performance, level of service, MKJI 1997, *PTV VISSIM*