

## Perancangan area parkir di Rest Area Tol Trans Jawa Km 207a menggunakan integer linear programming = Rest Area parking design using integer linear programming

Joshua Kristianto, author

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### Abstrak

#### <b>ABSTRAK</b><br>

Performa logistik Indonesia di tahun 2018 berada di peringkat ke-46 di dunia, dan ke-5 di wilayah ASEAN, dengan sub-indikator infrastruktur berada di peringkat dua terbawah dari enam sub-indikator lainnya. Pemerintah menambahkan 200 kilometer ruas tol baru ke jalan tol Trans-Jawa dengan total panjang 700 kilometer. Ruas tol ini akan dilengkapi dengan 61 tempat istirahat (rest area) sepanjang jalan. Di libur Idul Fitri, ketika lalu lintas meningkat hingga 460%, tempat istirahat menjadi penuh, mengakibatkan kemacetan di ruas tol. Dalam penelitian ini, metode optimasi program linear integer digunakan untuk memodelkan tata letak area parkir untuk menentukan sudut parkir yang optimal serta jumlah lot parkir. Fungsi tujuan adalah memaksimalkan kapasitas area parkir. Variabel penentu adalah jumlah baris parkir ( $X_{et}, \#952;, X_{ep}, \#952;, X_e, \#952;, X_{ip}, \#952;, X_i, \#952;$ ) dan jumlah kendaraan parkir ( $N_{et}, \#952;, N_{ep}, \#952;, N_e, \#952;, N_{ip}, \#952;, N_i, \#952;$ ), dengan keduanya berdasarkan pada lima sudut parkir yang berbeda ( $0^\circ, 30^\circ, 45^\circ, 60^\circ, 90^\circ$ ). Variabel pembatas yaitu lebar area parkir ( $W$ ), panjang ( $L$ ) dan panjang area di bagian tengah ( $L$ ) dan pembatas non-negatif. Penelitian dilakukan di tempat istirahat Km 207a tol Palikanci. Area parkir saat ini dibagi menjadi 15 area untuk dapat dimodelkan. Hasil optimasi menunjukkan bahwa program linear integer dapat meningkatkan kapasitas parkir, dari 41 ke 105 bus/truk dan 258 ke 473 mobil.

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#### <b>ABSTRACT</b><br>

Indonesias logistic performance index in 2018 was ranked 46th in the world, and 5th in the ASEAN region, with the infrastructure sub-indicator was the second lowest of six others. The government added new 200 to the 760 kilometres Trans-Java toll road. It will be equipped with 61 rest areas along the road. In Eid al-Fitr holiday, where traffic increased up to 460%, rest areas were full, resulting in heavy congestion. In this research, Integer Linear Programming (ILP) is used to model the parking layout to determine the optimal parking angle and the parking lot number. The objective is to maximize the parking area capacity. The decision variables are the number of parking rows ( $X_{et}, \#952;, X_{ep}, \#952;, X_e, \#952;, X_{ip}, \#952;, X_i, \#952;$ ) and the number of parking vehicles ( $N_{et}, \#952;, N_{ep}, \#952;, N_e, \#952;, N_{ip}, \#952;, N_i, \#952;$ ) both based on five parking angles ( $0^\circ, 30^\circ, 45^\circ, 60^\circ, 90^\circ$ ). The constraints are the width of the parking lot ( $W$ ), the length ( $L$ ), and length of area in the middle line ( $L$ ) and non-negative constraints. The study was conducted at rest area km 207A in Palikanci toll road. The existing parking area was divided into 15 areas to fit the model. The result showed that Integer Linear Programming can enhance the parking capacity, from 41 to 105 buses/trucks and 258 to 473 cars