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## Modification of Saturation Flow Formula by Width of Road Approach

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### Abstract

Saturation flow formula,  $S=600W_e$  is common used in Indonesia for any width of road approach at signalized intersections. In supporting the truth of the formula, it was held the observation at several signalized intersections in Bandung city. The signalized intersections have the width of road approaches in varies from 3 up to 12 meters.

The observations had been done in morning, noon, and afternoon peak times to get the values of observed saturations flows for each road approach. Then the field results are compared with the values of formula calculations. When the rank width of road approaches is small (3, 4, 5.9 m) up to medium (6, 7, 8.9 m) the values of saturation flows are closed each other.

When the rank width of road approaches become large (9, 10, 11, 12 m) there are significant different between observed and calculated values of saturation flows. By using computerized program the closed formula with observed values is  $S=500W_e+400$  for large width of road approach.

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*Keywords: saturation flow; width of road approach; observed and calculated values;*

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## 1. Background

Traffic problems is a matter of great importance problem and needs to get attention because of traffic at this time has a complex nature, especially in the big cities and towns are being developed. The problems arising from traffic congestion is a problem generally and accidents in roads or intersections. Solving this problem should start from the observation of the existing road network and regulate tools, as well as regulatory system is also required from the vehicle movement is good and right.

Understood that the differences in the gap between the actual circumstances in the field based on the results obtained and the existing calculation, there are things that are not accurate such as the use of formula and the necessary planning parameters. One parameter that is required is the amount of saturated flow that will be discussed in this study.

## 2. The Aims of research

The purpose of this research is to conduct observations in the field of saturated flow that occurred at some particular intersections and then the observations are compared with the formula  $S = 600W_e$ , therefore obtain the truth formula  $S = 600W_e$  are or need a modification of the formula  $S = 600W_e$  ( $S$ =saturated flow,  $W_e$ = effective width of road).

## 3. Problems of research

In this research, the problem is limited to the calculation of saturation flow at the locations to be observed, namely four locations in the city center of Bandung intersections during peak hour. Selected intersection is located at the crossroads between Pasirkaliki road – Kebon Kawung road, crossroads between Martadinata road – Seram Trunojoyo road, crossroads between Cihampelas road –Wastukencana road, crossroads between Asia Afrika road – Ahmad Yani road.

## 4. Definition of intersection

Intersection is the point of road network where roads intersect and where vehicle trajectories intersect. The traffic movement on each leg of intersection using road space at the intersection together with other traffic movements. Intersection is the most important factor in determining the capacity and travel time on a road network, especially in urban areas. Intersection is also the place where most accidents occur.

## 5. Hierarchy of intersection control

Traffic movement at intersection could be controlled by various control measures. The control is to follow a particular hierarchical order according to the types of roads that crossing and the volume of traffic entering the intersection. This hierarchy can be divided into two major parts, such as:

### 1. At Grade Junctions or Intersections.

The junction is that the arms intersect at a single plane. Types of control systems include:

- a. Type of traffic without setting,
- b. Type quit or stop settings (Priority),
- c. Type settings manually (traffic police),
- d. Type of arrangement with traffic control lights,
- e. Type of arrangement with the roundabout traffic.

### 2. Elevated Junctions or Interchanges.

Interchange is the legs that do not crossing each other, but crossing each other with different heights from one leg to the other leg

### 3. At the intersection there are four vehicles over the motion, such as:

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