**2.1. An Analysis of saturation flow volume estimation procedures**

The Ukrainian procedure for estimating saturation flow volume is quite simple. The volume of the basic saturation flow is determined considering roadway width. It is then adjusted to accommodate the longitudinal grade, turning radiuses and how vehicles are distributed among the available directions (straight, left or right) using the appropriate adjusting coefficients. Other factors that define traffic conditions (presence of pedestrians, curbside parking, lighting, type and condition of pavement etc.) are added using an additional coefficient [5].

The Canadian procedure for estimating saturation flow volume starts from a baseline saturation flow volume which is specific for each area (province). It fluctuates from 1665 passenger car units (pcu) per hour (h) (Fredericton) to 2100 pcu/h (Calgary). For intersections whose geometric parameters are less than ideal, the saturation flow volume can be obtained using appropriate adjustment factors [2].

Adjustment factors reflect the impact of the intersection’s geometric parameters (lane width, longitudinal grade, turning radius, length of additional lanes before and after the intersection for queuing and discharging), traffic conditions (public transportation stops, curbside parking, pedestrians) and control conditions (length of green light and the composition of its phases).

The adjusted saturation flow volume is estimated using the formula [2]:

 $S=S\_{0}f\left(F\_{??}\right)$, (1)

whereis the volume of the basic saturation flow; is the adjustment of the saturation flow volume, whose variables consist of the relevant adjustment factors.

Additionally, the Canadian procedure considers the impact of weather conditions, the condition of the pavement and geography separately [2].

The American procedure for estimating saturation flow volume uses 1900 pcu/h for one lane as the basic saturation flow volume [3]. The actual saturation flow volume is then adjusted for local conditions using the following formula:

 $S=S\_{0}Nf\_{w}f\_{HV}f\_{g}f\_{p}f\_{bb}f\_{a}f\_{LU}f\_{LT}f\_{RT}f\_{Lpb}f\_{Rpb}$, (2)

where  is the basic saturation flow volume;  is the number of lanes in the lane group; and  are the adjustment coefficients related to lane width, flow structure, approach grade, curbside parking, hindrance of public transport stops, area type, lane utilization, right and left turns, pedestrian movement for left turns and pedestrian and bicycle movement for right turn.

All the listed procedures start with the ideal saturation flow volume and adjusted values obtained from all the procedures vary between1700-2100 pcu/h which corresponds to a 1.7-2.1 second interval between vehicles. The fact that such intervals exist during peak volume is confirmed by Keroglu, Kaluzhskyy and Lobanov’s research [6, 7]. The saturation flow volume of 1800-2560 pcu/h was corroborated by Akcelik and Besley’s field investigations [8].