

TRAFFIC ENGINEERING

Civil Engineering Department

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* Methods of Conducting Volume Counts

1. Manual Counts: An observer records on a data sheet the passage of each vehicle according to its type or classification.
2. Machine Counts: used several technology such as video camera or special instruments to record the vehicle passage through special sensors installed on the road, which may be used as permanent counters.
3. Moving - Vehicle Technique:

In this technique, the observer makes a round trip on a test section as shown in Figure (1), where it assumed that the road runs east-west.

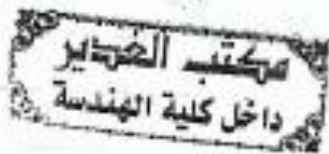


Figure: Moving - Vehicle Technique

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The volume (V_w) in the westbound direction can then be obtained from the expression:

$$V_w = \frac{(N_e + O_w - P_w) 60}{T_e + T_w}$$



where:

- T_e : the time it takes to travel from $x-x$ to $y-y$, in minutes.
- T_w : the time it takes to travel from $y-y$ to $x-x$, in minutes.
- N_e : number of vehicles traveling west in the opposite lane while the test car is traveling east.
- O_w : number of vehicles that overtake the test car while it is traveling from $y-y$ to $x-x$.
- P_w : number of vehicles that the test car passes while it is traveling from $y-y$ to $x-x$, that is traveling the westbound direction.
- $(N_e + O_w - P_w)$: is the number of vehicles traveling westward that cross the line $x-x$ during $(T_e + T_w)$.

The average travel time \bar{T}_w in the westbound direction is obtained from equation below:

$$\frac{\bar{T}_w}{60} = \frac{T_w}{60} - \frac{O_w - P_w}{V_w}$$
$$\bar{T}_w = T_w - \frac{60(O_w - P_w)}{V_w}$$

Example:

The data in Table (1) were obtained in a travel time study on a section of highway using the moving-vehicle technique. Determine the travel time and volume in each direction at this section of the highway.

Run direction number	Travel time (min.)	N_e	O_e	P_e
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Eastward

1	2.75	80	1	1
2	2.55	75	2	1
3	2.85	83	0	3
4	3.0	78	0	1
5	3.05	81	1	1
6	2.75	79	3	2
7	2.82	82	1	1
8	3.08	78	0	2
average	2.85	79.5	1.00	1.5

Table (1) Data from travel time study using Moving-Vehicle Technique.

Westward	Travel time (min)	N_w	O_w	P_w
1	2.95	78	2	0
2	3.15	83	1	1
3	3.2	82	1	1
4	2.83	86	1	0
5	3.30	80	2	1
6	3.00	79	1	2
7	3.22	82	2	1
8	2.91	81	0	1
Average	3.07	82.25	1.25	0.875

Table (1) Continued.

Solution:

The volume in the westbound direction:

$$V_w = \frac{(N_w + O_w - P_w) 60}{T_e + T_w}$$

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$$V_w = \frac{(79.5 + 1.25 - 0.875) 60}{2.85 + 3.07} = 809.5 \approx 810 \text{ veh/hr}$$

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Similarly, calculate the volume in the eastbound direction:

$$V_e = \frac{(82.25 + 1.00 - 1.5)60}{2.85 + 3.07} = 828.5 \text{ or } 829 \text{ vph}$$

$$\bar{T}_w = 3.07 - \left(\frac{1.25 - 0.875}{810} \right) 60 = 3.0 \text{ min.}$$

$$\bar{T}_e = 2.85 - \left(\frac{1.00 - 1.5}{829} \right) 60 = 2.9 \text{ min.}$$