# CHAPTER VIII

## CONCLUSIONS AND RECOMMENDATIONS.

### Conclusions

The following conclusions, can be drawn from the results, and the important findings pertaining to the study are summarized below.

1) Traffic stream models for streets studied are summarized in Table 9.

2) Speed-flow diagram for various categories of streets studied are shown in Figure 23.

3) Previously proposed integer m, l macroscopic models did not accurately represent the speed-density data sets.

4) The three most important characteristics of traffic are flow, speed, and density. The relationships among these three variables are called "traffic stream model".

5) Traffic flow can be divided into three zones; zone of normal flow, zone of unstable flow, and zone of forced flow.

6) Traffic flow is affected by many factors. Some of the significant factors are: speed limit, frequency of intersections, parked vehicles, bus stops, pedestrians, land use and activities of the surrounding area, weather condition, geometric arrangements of the roadway, the personal nature of individual drivers and their attitudes during driving, the characteristics of the vehicles, surface condition, and so on.

Table 9 Summary of macroscopic equations* (selected traffic flow models) for the streets studied.

| Streets | Macroscopic equations | | |
|---|---|---|---|
| | u - k | q - k | u - q |
| 1. Rama I Road | $u^{0.6} = 11.83 - 0.278k^{0.6}$ | $q = k(11.83 - 0.278k^{0.6})^{1.66}$ | $q = u(42.55 - 3.6u^{0.6})^{1.66}$ |
| 2. Rama IV Road | $u^{0.9} = 42.3 - 0.34k^{0.8}$ | $q = k(42.3 - 0.34k^{0.8})^{1.11}$ | $q = u(124.41 - 2.94u^{0.9})^{1.25}$ |
| 3. Yaowaraj Road | $u = 55.3 - 8.14k^{0.3}$ | $q = k(55.3 - 8.14k^{0.3})$ | $q = u(6.79 - 0.123u)^{3.33}$ |
| 4. Ratchadamnoen Khang Road | $u^{0.6} = 11.68 - 0.080k^{0.8}$ | $q = k(11.68 - 0.080k^{0.8})^{1.66}$ | $q = u(146.0 - 12.50u^{0.6})^{1.25}$ |
| 5. Phaholyothin Road | $u^{0.8} = 32.24 - 3.0k^{0.4}$ | $q = k(32.24 - 3.0k^{0.4})^{1.25}$ | $q = u(10.75 - 0.333u^{0.8})^{2.5}$ |
| 6. Sukhumvit Road | $u^{0.9} = 40.64 - 0.802k^{0.7}$ | $q = k(40.64 - 0.802k^{0.7})^{1.11}$ | $q = u(50.67 - 1.25u^{0.9})^{1.43}$ |
| 7. New Petchbury Road | $u^{0.6} = 12.96 - 0.113k^{0.8}$ | $q = k(12.96 - 0.113k^{0.8})^{1.66}$ | $q = u(114.69 - 8.85u^{0.6})^{1.25}$ |
| 8. Raj Prarop Road | $u^{0.9} = 34.65 - 3.23k^{0.4}$ | $q = k(34.65 - 3.23k^{0.4})^{1.11}$ | $q = u(10.73 - 0.31u^{0.9})^{2.5}$ |
| 9. Charoen Krung Road | $u^{0.7} = 14.84 - 0.237k^{0.7}$ | $q = k(14.84 - 0.237k^{0.7})^{1.43}$ | $q = u(62.62 - 4.22u^{0.7})^{1.43}$ |
| 10. Raj Vithee Road | $u^{0.5} = 8.37 - 0.147k^{0.7}$ | $q = k(8.37 - 0.147k^{0.7})^{2}$ | $q = u(56.94 - 6.89^{0.5})^{1.43}$ |
| 11. Lat Phrao Road | $u^{0.6} = 12.38 - 0.111k^{0.8}$ | $q = k(12.38 - 0.111k^{0.8})^{1.66}$ | $q = u(111.53 - 9.01u^{0.6})^{1.25}$ |
| 12. Phrachao Taksin Road | $u^{0.5} = 7.58 - 0.014k^{1.1}$ | $q = k(7.58 - 0.014k^{1.1})^{2}$ | $q = u(541.43 - 71.43u^{0.5})^{0.9}$ |
| 13. Phran Nok Road | $u^{0.6} = 11.22 - 0.194k^{0.7}$ | $q = k(11.22 - 0.194k^{0.7})^{1.66}$ | $q = u(57.84 - 5.15u^{0.6})^{1.43}$ |
| 14. Ramkhamhaeng Road | $u^{0.6} = 12.85 - 0.131k^{0.8}$ | $q = k(12.85 - 0.131k^{0.8})^{1.66}$ | $q = u(98.09 - 7.63u^{0.6})^{1.25}$ |
| 15. Soi Sena Nikhom 1 | $u^{0.9} = 36.05 - 1.06k^{0.7}$ | $q = k(36.05 - 1.06k^{0.7})^{1.11}$ | $q = u(34.01 - 0.943u^{0.9})^{1.43}$ |
| 16. Soi Aree | $u^{0.5} = 5.63 - 0.069k^{0.9}$ | $q = k(5.63 - 0.069k^{0.9})^{2}$ | $q = u(81.59 - 14.49u^{0.5})^{1.11}$ |
| 17. Chula Soi 12 | $u^{0.3} = 2.97 - 0.003k^{1.4}$ | $q = k(2.97 - 0.003k^{1.4})^{3.33}$ | $q = u(990 - 333.33u^{0.3})^{0.71}$ |

* Microscopic equations can be obtained by substituting m and l value in Eq.25

7) The important applications of traffic stream models are: (a)to improve traffic efficiency, and (b) to design of freeway surveillance and control system.

8) The method of collecting data in order to obtain traffic stream model in this research is practical method because it is quick, easy, reasonable precision, and economic.

9) The other typical data sets can be analyzed by this computer program, as shown in Appendix E.

10) Some streets studied took much longer time to collect the data of traffic flow characteristic over the range of all possible density.

11) It is a characteristic of speed-flow data that there is a scatter of speeds at any given flow.

12) By examination of plots of data, they generally show a large scatter of points in the vicinity of the capacity.

13) It is shown that over the range of each data set, of urban street, there seems to be an exponential relationship between the space mean speed of traffic and its density.

14) The certain categories or types of traffic facilities could not be indicated by the m, l combination.

15) Measurement of flow and density for short times or short lengths of roads or highways lead to greatly fluctuating values.

Recommendations.

For the purpose of this research and method of collecting data, the single-regime traffic flow model by using generalized car-following equation is accurate enough to use, it is not required further evaluation

for improvement in selecting macroscopic models as in Ref. 24 and 28.

For further studies, if the single-regime traffic flow model does not fit the data as well as would be expected, while the statistical criteria and the traffic flow requirements are satisfied, the fit of data could be improved. This give rise to the assumption that even with the use of non-integer exponents, m and l, the generalized car-following equation is not flexible enough to adjust itself to the observed data considering a single-regimes. It appears that either a more different "generalized car-following equation" is needed or multi-regime speed-density relationships may be required if a better fit of the data set is to be obtained. It is also required instruments, such as twenty-pen recorder, for collecting data.