# Analysing Delay with Los at the Major Intersections of OMR Stretch (Chennai)

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*Abstract*— The challenges of the urban transportation in India are growing rapidly, and government agencies at various levels are taking steps to address the performance gaps in service delivery. The study deals with the analysis of service levels at the intersections of Old Mahabalipuram Road stretch (OMR) in Chennai. The delay is analyzed at each major intersection for every phase and is ranked with the level of service. Based on the level of service, the transportation engineers will be able to suggest a sustainable solution for the traffic congestion. The travel time in the major arterial roads can be effectively improved and forecasted for the future travel demand.

***Key words:*** Intersections, Delay, Photographic method

## I. INTRODUCTION

There has been a phenomenal growth of motor vehicles in India in the recent past. The disproportionate growth in the traffic vis-a-vis growth in road length, along with unauthorised encroachments on road space, lack of traffic and lane discipline and deficiencies in traffic control have contributed to the increasing problem of congestion in urban areas. In addition to increased travel time and delays, traffic congestion increases air pollution due to vehicular emissions. There is no consistent definition of congestion in terms of a single measure or set of measures that considers severity, duration, and spatial extent. Measures related to travel time and speed are the most flexible and useful for a wide range of analyses. Congestion can be defined as follows.

- Congestion is travel time or delay in excess of that normally incurred under light or free flow travel conditions.
- Unacceptable congestion is travel time or delay in excess of an agreed upon norm. The agreed upon norm may vary by type of transportation facility, travel mode, geographic location and time of day.

Research organization and technical bodies have recommended standards and specifications for all design parameters to the generalized situations. The type and intensity of congestion depends on many quantifiable factors such as volume, speed, headway, ratio of slow moving and fast moving vehicles etc.

## II. LEVEL OF SERVICE

When a road is carrying a traffic equal in volume to its capacity under ideal roadway and traffic conditions, the operating conditions become poor. The concept of levels of service is defined as qualitative measure describing the operational conditions with in a traffic stream, and their perception by motorists and passengers.

The following factors considered in evaluating level of service:

- Speed and travel time
- Traffic interruptions or restriction
- Freedom to man oeuvre to maintain the desired operating speeds
- Driving comforts and convenience
- Economy, with due consideration operating cost of the vehicle

Highway Capacity Manual (HCM), therefore, utilizes:

- Travel speed
- Ratio of the service volume to capacity, depending up on the particular problem the latter is often referred to as "υ/c ratio" in the manual

### *A. Level of service A:*

Free flow, with low volumes and high speeds. Traffic density is low, with speeds controlled by driver's desired speed limits and physical roadway conditions.

### *B. Level of service B:*

Zone of stable flow, with operating speeds beginning to be restricted somewhat by traffic conditions. Drivers still have reasonable freedom to select their speed and lane of operation. Reduction in speed is not unreasonable

### *C. Level of service C:*

Most of the drivers restricted in the freedom to select their own speed, lane changing or overtaking, man oeuvres. A relatively satisfactory operating speed is still obtained with service volumes perhaps suitable for urban design practice.

### *D. Level of service D:*

Fluctuations in volume and temporary restrictions to flow may cause substantial drops in operation speeds, drivers have little freedom to man oeuvre.

### *E. Level of service E:*

It cannot be described by speed alone but also represents operations at even low speeds than in level D, with volumes are near capacity of highway. Speeds are typically not always in neighbourhoods of 50 K.P.H.

### *F. Level of service F:*

Forced flow operations at low speeds, where volumes are below capacity. Speeds are reduced substantially and stoppages may occur for short or long periods of time, because of downstream congestion. In the extreme, both speed and volume can drop to zero.

## III. SELECTION OF STUDY AREA:

The area selected for this study is OMR stretch in Chennai which is abbreviated as Old Mahabalipuram Road corridor. The stretch elongates up to 45.1 km starting from Madhyakailash to Mahabalipuram. OMR stretch is one of the heavy traffic floating road in Chennai because of the

 

road containing IT parks and serves as one of the way to mahabalipuram. It includes six intersections on the entire stretch.

*A. Reasons for Selecting the Study Area (OMR):*

- OMR has heavy traffic which serves in accurate results while surveying.
- More number of intersections.
- Easy to analyse since its nearer to our university campus.
- Well known road, which facilitates the making of survey easier.
- Heavy traffic, which helps to determine the survey at any time.

## IV. SELECTION OF INTERSECTIONS:

OMR stretch generally include six intersections namely Madhyakailash, Thiruvanmiyur, SRP, Shollinganallur, Kelambakkam-vadapalani, Kelambakkam-ECR. But we have selected mainly three intersections for the video graphic survey. They are intersections of Kelambakkam, Shollinganallur and Thiruvanmiyur which are main very main intersections with heavy floatation of traffic all the time.

## V. STUDY ON DELAY

The intersections considered are Kelambakkam, Shollinganallur, Tiruvanmiyur which are found to be the major one. These intersections are more congested than any other intersections of that particular OMR stretch. Hence the congestion leads to delay for each and every individual travel time. It is necessary to collect the data related to delay for the individual. In this study, since the intersections are signalized, the delay measured to be the signal phase timings whichever maximum. The delays in seconds are tabulated below:

*A. Kelambakkam Intersection:*

| S. No | Road Direction | Delay in seconds | Remarks |
|---|---|---|---|
| 1 | E.C.R to Shollinganalur | 60 | |
| 2 | E.C.R to Bus stop | 60 | |
| 3 | Kelambakkam bus stop to E.C.R | 0 | Free left |
| 4 | Sholinganallur to bus stop | 0 | Free left |
| 5 | Shollinganallur to E.C.R | 60 | |
| 6 | Bus stop to Shollinganallur | 60 | |
| 7 | Inflow to vandaloor | 0 | Free left |
| 8 | Out flow to vandaloor | 0 | Free left |

Table 1: Kelambakkam Intersection

*B. Shollinganallur Intersection:*

| S. No. | Road Direction | Delay in seconds | Remarks |
|---|---|---|---|
| 1 | Mahyakailash to kelambakkam | 150 | |
| 2 | Madhyakailash to E.C.R | 0 | Free left |
| 3 | Madhyakailash to tambaram | 150 | |
| 4 | Kelambakkam to madhyakailash | 150 | |
| 5 | Kelambakkam to tambaram | 0 | Free left |
| 6 | Kelambakkam to E.C.R | 150 | |
| 7 | Tambaram to madhyakailash | 0 | Free left |
| 8 | E.C.R to kelambakkam | 0 | Free left |

Table 2: Shollinganallur Intersection

*C. Thiruvanmiyur Intersection:*

| S. No. | Road Direction | Delay in seconds | Remarks |
|---|---|---|---|
| 1 | Shollinganallur to madhyakailash | 150 | |
| 2 | Shollinganallur to Adyar | 150 | |
| 3 | Adyar to Madhyakailash | 150 | |
| 4 | Adyar to Shollinganallur | 0 | Free left |
| 5 | Madhyakailash to Shollinganallur | 150 | |
| 6 | Madhyakailash to Adyar | 0 | Free left |

Table 3: Thiruvanmiyur Intersection

*D. Delay time considered for each intersection:*

The Delay time for each intersection is considered to be maximum of all the phase in each of the intersection. For e.g., in shollinganallur intersection, four phases are in delay of 150 seconds and four phases are zero with free movement for turning. Hence for this intersection, the delay is considered to be 150 seconds

| S. No. | Name of the Intersection | Delay (seconds) |
|---|---|---|
| 1 | Kelambakkam | 60 |
| 2 | Shollinganallur | 150 |
| 3 | Thiruvanmiyur | 150 |

Table 4: Delay time considered for each intersection

## VI. LEVEL OF SERVICE ANALYSIS

| S.No | Number of Signal Phases | Capacity (vph) |
|---|---|---|
| 1 | Two-phase | 1850 |
| 2 | Three-phase | 1760 |
| 3 | Four or more | 1700 |

Table 5: Design Capacity

*A. Level of Service Criteria for Signalized Intersections: (2000 HCM):*

| LEVEL OF SERVICE | STOPPED DELAY(SECONDS) |
|---|---|
| A | <=10.0 |
| B | 10.1 to 20.0 |
| C | 20.1 to 35.0 |
| D | 35.1 to 55.0 |
| E | 50.1 to 80.0 |
| F | >80.0 |

Table 6: Level of Service Criteria for Signalized Intersections

*B. Study Area Analysis:*

The intersections in the study area is ranked based on the delay at the signalized intersection and are tabulated in

 

Table. The Level of Service is found to be C for Kelambakkam, E for Shollinganallur and D for Thiruvanmiyur by considering capacity ratio.

*C. Los for the Intersections of Study Area:*

| INTERSECTION | DELAY | L.O.S |
|---|---|---|
| Kelambakkam | 60sec | E |
| Shollinganallur | 150sec | F |
| Thiruvanmiyur | 150sec | F |

Table 6: Los for the Intersections of Study Area

## VII. SUMMARY AND CONCLUSION

The major intersections are chosen from the study area and the traffic flow study has been conducted by videographic survey and delay is found out from the videos. The level of service is ranked by considering the delay time in each intersection.

(1) The traffic volume is found to be maximum in Thiruvanmiyur intersection and followed by Shollinganallur. This clearly shows that between Thiruvanmiyur and Shollinganallur, the traffic congestion plays vital role which generally depends on the commercial areas in this region such as IT industries, Educational Institutions, Shopping malls
(2) The maximum delay is found to be maximum in Thiruvanmiyur and Shollinganallur intersections. This delay arises in the intersection because of the congestion of both vehicles and pedestrians at the intersections.

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