

Analysis of traffic congestion at Medavakkam and proposal for its remedial measures

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ABSTRACT

There are two main problems that modern day cities face, namely urban decay when parts of the city become run down and undesirable to live in, and traffic congestion. Traffic congestion is one of the key issues of transportation in Chennai Metropolitan area. The area that has been chosen for the case study is Medavakkam which has got two major junctions. It is a centre place to the fast developing suburbs like Ponmar, Shitlapakkam, Ottiyambakkam and a close proximity to IT corridors and railway stations. Hence the increasing number of vehicles on this road is very high.

Our project includes a thorough analysis of traffic congestion and to propose a suitable remedy for it. The average number of vehicles passing through this road and its types has been observed and shown in charts so that an appropriate solution to reduce traffic congestion can be suggested.

KEY WORDS: Traffic, Road, Congestion.

1. INTRODUCTION

With the rapid growth of urban traffic, the contradiction between traffic demand and supply has become increasingly conspicuous, and traffic congestion has become a normal state. How to identify the frequent congested road sections, estimate their influence to the entire road network; and how to improve the connectivity and accessibility of the whole road network through local traffic reformation, have become important issues to transportation planners and managers. Traffic congestion can be characterized by the decrease in speed, the increase in travel time and the increase of vehicle's queue on the road. In addition, traffic congestion happens when the road demand exceeds the road capacity.

Transportation plays a vital role in everyday life. Movement of goods from one place to another is what the development relies on. Fortunately or unfortunately at one point of a time we all have gone through this bitter experience of traffic congestion. The rapid growth of motor vehicles, leads to serious urban traffic congestions, and affects people's work and life seriously. Establishing an effective traffic congestion analysis and evaluation methods, and monitoring the evolvement of congestion state, will provide strong support to transportation management and planning. Not only the decrease in nation's economy, it torments our physical and mental stature. In addition to that its contribution towards global warming is in excess.

Study area: The study area is Medavakkam. It is one among the southern suburbs of Chennai, the capital city of Tamil Nadu. It is a residential municipality close to the Chennai Airport and is adjacent to the suburbs of Madipakkam, Selaiyur, Keelkattalai, Velachery and Tambaram and it is center place to the developing suburbs like Ponmar, Ottiyambakkam and Sithalapakkam. This location seems to be a quickly developing residential spot due to its close proximity to the IT corridor OMR (approx 4 km from Sholinganallur) and SEZ in Medavakkam Sholinganallur Road. This is a residentially preferred area due to its calm and airy locality, sweet ground water and access to good educational institutions.

Objectives:

- To analyze traffic congestion on these junctions.
- To take into account the future developments on neighbor areas.
- To bring out safety measures for the pedestrians.
- To propose a remedy for the existing scenario as well as for the near future.
- To make a model with the proposed remedial measure.

Observations and findings: Few of the buses plying through Medavakkam are:

- A51: Tambaram to Broadway (Via Velachery)
- PP51: Tambaram to High Court
- 51D: Tambaram to Highcourt
- T51: Tambaram to Thiruvanmiyur (Via Thoraipakkam)
- 5A: Tambaram to T-nagar
- M15: Medavakkam to Mylapore
- M14: Medavakkam to St Thomas Mount
- 51L: Tambaram to CMBT
- M51V: T-Nagar to KOLATHUR
- M51B: Saidapet to Karanai

Below is the record of accidents in Chennai involving pedestrians from year 2005 up to 2010 (April). Many even go unreported.

Table.1. Accidents in Chennai involving pedestrians.

YEAR	NO. OF INJURED	NO. OF DEATH
2005	1,431	227
2006	1,360	251
2007	1,312	226
2008	1,051	169
2009	1,243	268
2010 (UP TO APRIL)	369	51

Source: Traffic initiation, Pallavaram

Road without foot path: Entire stretches of Medavakkam area are found to have narrow footpath. Footpath of two junctions in Medavakkam is extremely poor in all side of road or we can say there is no footpath at all. Pedestrians are compelled to walk roadside braving the rush of the vehicles. But now as traffic has increases enormously, demand of road widening and foot path for pedestrian has become a voice to rise. Most of free spaces meant for foot are used by the fruit vendors and petty shops as shown in the figure.



Figure.3. Fruit vendors using the foot path

Poorly maintained drains in medavakkam: The drains on Medavakkam road are poorly maintained. Instead of acting as a medium for the flood water to pass through it has become a dumping place and a majestic haven for mosquito breeding.



Figure.4. Poorly maintained drain in Medavakkam

Untidy bus stand: The two bus stands in Medavakkam are very near to the main road. It is one of the prime causes for traffic congestion in Medavakkam. The bus stand1 is from the center line of the road and bus stand2 is from the center line.



Figure.5. Location of bus stand

Unused pavements: The pavements in Medavakkam Road are totally unused. The used water from nearby hotels and restaurants are openly let off. Plastic containers, tyres and polythene bags are thrown into it. Off-street parking is also done in free style.

Width of road: There are total five roads joining at Medavakkam. The following roads are described below:
Medavakkam- Mambakkam road: The width of this road is at present only 10 meter wide but well surfaced. This road is connected to Madambakkam and Kelambakkam and is one of the busiest roads in this area. The unused space for pavement is 4 meter on either side. This road is a two lane two way road.

Medavakkam- Sholinganallur road: This is a private road of about 20 meter width separated by a divider. It is double lane one way road. This road connects some public and popular places such as Global Health hospital, Sholinganallur, East Coast Road, Thoraipakkam etc. IT corridors and some renowned Colleges and Universities are connected by this road.

Road towards Tambaram: This is 24 meter width separated by a divider. This road connects Shitlapakkam, Sembakkam, Madambakkam, Camp road, Tambaram and Bangalore highway. The Madras Christian collage with student from all over the world is located in Tambaram.

Data analysis:

Average numbers of vehicles flowing in and out of Pillaikoli Street from Monday to Friday:

Table.2. Number of vehicles flowing into Pillaikoli Street

Type of vehicle	Time in hours							
	6 to 8	8 to 10	10 to 12	12 to 14	14 to 16	16 to 18	18 to 20	20 to 22
2- wheeler	230	243	198	150	160	267	325	311
3-wheeler	35	38	30	24	22	32	16	6
4-wheeler	28	20	21	23	21	27	28	16
H.M.V	16	18	14	13	14	9	2	3
Others	26	21	18	20	16	22	2	0
Cycle	44	38	28	20	10	56	74	25
TOTAL	379	378	309	250	242	413	447	361

Table.3. Number of vehicles flowing out of Pillaikoli Street.

Type of vehicle	Time in hours							
	6 to 8	8 to 10	10 to 12	12 to 14	14 to 16	16 to 18	18 to 20	20 to 22
2-wheeler	380	403	321	290	298	367	305	286
3-wheeler	32	38	27	24	19	26	29	28
4-wheeler	52	47	36	27	29	49	35	38
H.M.V	40	32	38	35	38	16	4	2
Others	42	38	39	26	38	17	2	1
Cycle	38	52	18	15	26	35	18	6
Total	584	620	479	417	448	510	393	361

Average number of vehicles flowing in and out Medavakkam-Mambakkam road from Monday to Friday:

Table.4. Number of vehicles flowing into Mambakkam road.

Type of vehicle	Time in hours								
	6 to 8	8 to 10	10 to 12	12 to 14	14 to 16	16 to 18	18 to 20	20 to 22	6 to 8
2-wheeler	315	360	300	260	200	472	452	380	150
3-wheeler	70	120	93	72	110	120	90	42	7
4-wheeler	42	54	42	33	16	36	34	68	34
H.M.V	70	50	42	34	28	53	48	27	4
Others	12	20	10	7	5	8	6	3	1
Cycle	47	53	9	6	4	9	15	7	2
Total	556	657	496	412	363	698	645	527	198

Table.5. Number of vehicles flowing out of Mambakkam road.

Type of vehicle	Time in hours								
	6 to 8	8 to 10	10 to 12	12 to 14	14 to 16	16 to 18	18 to 20	20 to 22	22 to 24
2-wheeler	352	409	338	305	311	425	438	348	296
3-wheeler	92	109	93	86	97	98	87	76	63
4-wheeler	36	42	33	20	37	40	31	21	18
H.M.V	48	46	34	31	33	53	49	36	29
Others	10	11	9	6	5	8	9	4	1
Cycle	56	71	38	30	43	79	39	28	15
Total	594	688	545	478	526	703	653	513	422

Average number of vehicle flowing towards Velachery from Monday to Friday:

Table.6. Average number of vehicles flowing towards Velachery from Medavakkam

Type of vehicle	Time in hours								
	6 to 8	8 to 10	10 to 12	12 to 14	14 to 16	16 to 18	18 to 20	20 to 22	22 to 24
2-wheeler	1025	1128	984	905	897	1309	1278	1010	898
3-wheeler	256	306	298	276	259	386	236	196	157
4-wheeler	202	197	182	129	132	196	256	156	128
H.M.V	179	187	168	166	173	186	189	159	126
Others	79	96	84	76	74	62	48	36	30
Cycle	95	121	56	38	49	131	97	26	15
Total	1836	2036	1772	1590	1581	2270	2104	1424	1354

Table.7. Average number of vehicles flowing into Medavakkam from Velachery

Type of vehicle	Time in hours								
	6 to 8	8 to 10	10 to 12	12 to 14	14 to 16	16 to 18	18 to 20	20 to 22	22 to 24
2-wheeler	876	997	849	938	835	1016	986	938	846
3-wheeler	283	296	279	215	203	297	306	292	186
4-wheeler	198	205	186	176	179	192	201	156	128
H.M.V	180	186	175	177	189	186	166	142	120
Others	82	85	74	56	59	78	41	18	10
Cycle	109	120	98	75	79	89	62	21	09
Total	1728	1889	1661	1637	1544	1858	1762	1567	1299

Average number of vehicles flowing in and out from Tambaram from Monday to Friday:

Table.8. Number of vehicles into Medavakkam from Tambaram road

Type of vehicle	Time in hours								
	6 to 8	8 to 10	10 to 12	12 to 14	14 to 16	16 to 18	18 to 20	20 to 22	22 to 24
2-wheeler	1021	1102	985	976	897	995	1025	982	841
3-wheeler	305	356	298	271	264	378	312	275	212
4-wheeler	295	284	275	266	275	279	298	256	213
H.M.V	187	192	181	175	164	185	189	171	139
Others	68	62	59	48	47	55	58	45	26
Cycle	89	98	76	58	52	95	82	64	19
Total	1965	2094	1874	1794	1699	2005	1964	1793	1450

Table.9. Number of vehicle flowing towards Tambaram

Type of vehicle	Time in hours								
	6 to 8	8 to 10	10 to 12	12 to 14	14 to 16	16 to 18	18 to 20	20 to 22	22 to 24
2-wheeler	1063	982	957	876	891	1064	1098	956	841
3-wheeler	308	296	285	245	265	398	301	265	243
4-wheeler	286	295	275	271	254	261	279	288	253
H.M.V	195	198	184	185	173	168	192	198	152
Others	59	69	58	51	53	58	68	45	22
Cycle	92	97	71	65	69	78	65	56	21
Total	2003	1937	1830	1693	1705	2027	2003	1808	1532

Average number of vehicles flowing in and out of Sholingallur from Monday to Friday:

Table.10. Number of vehicles flowing into Medavakkam from Sholingallur

Type of vehicle	Time in hours								
	6 to 8	8 to 10	10 to 12	12 to 14	14 to 16	16 to 18	18 to 20	20 to 22	22 to 24
2-wheeler	985	1202	985	976	997	1295	1125	982	841
3-wheeler	305	356	298	271	264	378	312	275	212
4-wheeler	295	284	255	236	275	365	298	256	223
H.M.V	187	192	181	175	164	185	189	171	139
Others	68	62	59	48	47	55	58	45	26
Cycle	96	103	76	58	52	95	82	64	9
Total	1936	2199	1854	1764	1799	2373	2064	1793	1450

Table.11.Nos.of vehicles flowing out from Medavakkam towards Sholinganallur

Type of vehicle	Time in hours								
	6 to 8	8 to 10	10 to 12	12 to 14	14 to 16	16 to 18	18 to 20	20 to 22	22 to 24
2-wheeler	965	1012	941	925	997	1195	1105	982	641
3-wheeler	305	406	298	271	224	378	312	275	102
4-wheeler	295	324	255	206	275	405	298	256	198
H.M.V	187	197	165	175	164	185	189	171	119
Others	75	81	71	68	57	63	39	25	15
Cycle	96	103	76	78	86	96	79	56	5
Total	1923	2123	1806	1723	1803	2322	2022	1765	1080

Average number of vehicles flowing to and fro in Medavakkam during weekends:

Type of vehicle	Time in hours								
	6 to 8	8 to 10	10 to 12	12 to 14	14 to 16	16 to 18	18 to 20	20 to 22	22 to 24
2-wheeler	1700	2103	1803	1578	1732	2068	1932	1904	1286
3-wheeler	632	880	756	659	642	785	940	442	243
4-wheeler	657	806	743	438	542	724	975	635	442
H.M.V	416	684	524	522	443	532	428	417	128
Others	216	322	389	351	403	458	568	345	122
Cycle	192	197	171	165	169	172	165	116	21
Total	3813	4992	4386	3713	3931	4739	5008	4959	2242

Traffic analysis summary:

Bottlenecks (traffic demand exceeds roadway capacity)	50% of total congestion
Traffic incidents	25% of total congestion
Work zones	15% of total congestion
Bad weather	10% of total congestion
Poor signal timing	5% of total congestion

Table.13. table showing summary of traffic congestion caused at Medavakkam.**Future developments:**

- Proposed 1500-2000 apartments to be built behind Pillaikoli Street in the near future with parking facilities.
- A proposed 500 apartments in Shitlapakkam with parking on the way from Medavakkam to Tambaram.
- HCL Company is setting up its IT corridor on the way to Medavakkam- Sholinganallur road where hundreds of employees will daily cross Medavakkam junction.
- Some aqua industries are also expected to be established near Medavakkam-Mambakkam road.
- Global Health Hospital is also gaining popularity with its latest equipments and technology. Moreover clean and green friendly environment.

Remedial measures proposals: The proposals of remedial measures are done in the greater interest of future development and in nation's economy.

Widening of road: As we go from Tambaram before reaching Medavakkam the width of the roads has been widened up to 24 meter separated by a median of width 0.8 meter. Likewise the width of the entire important route like Pallikaranai and Sholinganallur should also be widened of the same dimension. Mambakkam road can be widened of the width dimension 16 meter separated by a median.

Foot over bridge: Roads which have a continuous flow of vehicles round the clock should have a foot over bridge for the pedestrians in order to avoid traffic congestion. As per our observation the busiest roads are intermediate between two junctions and Pallikaranai. Hence these two should be provided with FOB.

Zebra crossing: Proper demarcation for pedestrian crossings should be imposed to ensure that the pedestrians are able to cross easily during the signal. There is also the need to have a dedicated signal phase for pedestrians to ensure there's enough disciplined gap for people to cross

Diversion: As we have seen earlier that the entire Pillaikoli Street stretches up to 4 KM only. But the future development of around 2500 to 3000 apartment is behind this street where the road fails to meet. So most likely this street is expected to be a more populous after a short period of time. Also it happens to be that the vehicles coming out from Pillaikoli Street wants to turn left, they have to pass two junctions consecutively. Therefore in order to overcome these problems there will be a diversion of these road which meets at Medavakkam via Pallikaranai. The diverted road will be 18 meter in width.

Improved pavement and foot path: Pavements should be maintained at all time. Especially the corner areas where it is often filled with dust particles which makes two wheeler uneasy to ride. Barrier foot paths should be provided on the side of the road especially near institutional and hospital buildings.

Well maintained drainage: The drainage system should be well maintained at all time. During rainy season this measure will play a vital role in traffic congestion reduction. The drainage covers should not be left open creating difficulties for the passer-by.

Proper traffic signals: Traffic signals at the junctions should be properly functioning. The time interval should be uniform. The signals should be clear, bright and water resistant.

More use of public transport: People should be educated to use more of public transport than to their own private cars for office job. One of the reasons for the increase in traffic congestion is only 27% population use public transport while the rest use their own private vehicles.

Introduction of roundabout junction: An idea of introducing a roundabout junction with the following salient features:

- A roundabout junction is to be introduced on Medavakkam to Sholinganallur road.
- Roundabout junction will be of the diameter 50 meter (radius=25 meter)
- The roundabout will consist of three lanes each 6 meter width. At the center there is a fountain with light mast.
- There will be a round the clock free left turn.
- Basic informatory and warning signs will be put up before reaching the roundabout junction

2. CONCLUSION

The option of roundabout junction was adopted due to:

- Available of adequate space for an optimally sized central island to allow smooth turning radius.
- Presence of adequate turning radii for vehicles entering into the junction from all roads directions.
- Existing moderate traffic vehicles (<2500 vehicles/hr peak traffic). Roundabout Junctions are ideally recommended for < 3000 vehicles/hr of peak traffic.
- Other Remedial measures were adopted such as:
 - Well marked zebra crossing.
 - Optimum cycle period of 210 seconds introduced.
- Foot over bridge on Sholinganallur road, Velachery road and intermediate of both junctions should be constructed.
- Removal of petty shops and fruit vendors from the road corner.
- Restriction of heavy moving vehicles during the peak hours.
- Proper signals on both the junctions

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