7. RESULT AND DISCUSSION

7.1 OUTPUT FOR THE ROAD LAYOUT P

Figure 7.1: MATLAB output for the road layout P

Figure 7.1 shows the GUI output for the layout of P. Here the input parameters are assigned and the corresponding road layout is obtained. The contribution of TM and SM are of 50% and 30% each. EM and Env contributions are 10% each. The model diagram shows the model output for our proposed method. Here we have to furnish the input parameters such as vehicles, width, population, accident case, land usage and by means of the process we achieve appropriate layout with layout design and the individual contribution of each and every distinct criterion.
In Figure 7.1 the average number of vehicle is given by splitting in 4 different types as LMV, HMV, two wheelers and auto and the input is given as 1000, 200, 1400, 300 and width as 20 and population as 30 which lies under the sequence HDDGGDDH+HEFBGGBFEH and the corresponding output will be layout P. In this layout the contribution for TM and SM are 50% and 30% each. In this layout the capacity of each lane is 720 vehicles/lane. Hence this layout has two sections so the traffic can flow through the perceptive lanes without any disturbance. So the safety management will be high so its contribution will be low. Highlighting on energy and environment management, both seeks the same level of distribution. Accidental management (AM chart), Transportation Modal (TM chart) and its corresponding land usage is shown in the GUI output. In TM chart 1,2,3,4 represents LMV, HMV, Auto, and two wheelers.

7.2 OUTPUT FOR THE ROAD LAYOUT Q

![Figure 7.2: MATLAB output for the Road layout Q](image)

This GUI output Figure 7.2 shows the output of Q layout. Here the input for vehicle is LMV, HMV, tow wheelers and auto are 175, 279, 500,
246 respectively and width is 15 and population as 75 which lies under the sequence EDBFFBDE and the corresponding layout is Q and the capacity of each lane is 520 vehicles/hour. So the input for vehicle is given less than the capacity of total vehicles of all lanes. The contribution for each criterion is also described. As the amount of total vehicle is less hence the contribution will be more in the transport management and it is given as 20%. The accident case will be high and its contribution will be low and it is gives as 10%. Here the path for the pedestrian is allocated separately so the two wheelers can be reduced and hence energy consumption will be reduced and the environment pollution will be reduced. Hence both contribute to an average amount of 30% and 40% each. Among our road layout velachery main road and velachery side road satisfies this case. The lanes allocated for two wheelers are two and the vehicles per lane will be reduced by using the pedestrian path. Accidental management (AM chart), Transportation Modal (TM chart) and its corresponding land usage is shown in the GUI output. In TM chart 1,2,3,4 represents LMV, HMV, Auto, and two wheelers.

7.3 OUTPUT FOR THE ROAD LAYOUT R

![MATLAB output for the road layout R](image)

Figure 7.3: MATLAB output for the road layout R
This output Figure 7.3 provides for the layout of R. here the input of vehicle given as LMV, HMV, tow wheelers and auto are 608, 305, 1875, 266 respectively and width as 10 and population as 40 which lie under the sequence EDBGGBDE. The sustainable layout design is also given in the output. The capacity of each lane is 421 vehicles/hour. The contributions for each factor are also given with transport management as 20%. Since the vehicles are to be diverted in another area, the corresponding area allocation has to be managed in advance. The safety management will be 10% because the traffic conjunction will be low. On focusing energy and environment management there will be 30% and 40% respectively. Since there is separate allocation for pedestrian path the environment will be not so polluted and the energy will be reduced in very small amount. Accidental management (AM chart), Transportation Modal (TM chart) and its corresponding land usage is shown in the GUI output. In TM chart 1,2,3,4 represents LMV, HMV, Auto, and two wheelers.

### 7.4 OUTPUT FOR THE ROAD LAYOUT S

![MATLAB output for the Road layout S](image)

Figure 7.4: MATLAB output for the Road layout S
This GUI output Figure 7.4 is given for layout S. Here the input given for vehicle as LMV, HMV, tow wheelers and auto are 117, 20, 972, 131 respectively and width as 7.5 and population as 25 which lies under the sequence HEFAFEH+HBDDDDDBH then the output with corresponding layout is provided. Even the contribution of each factor is also given with a pie graph. In this layout there are two roads as divided into main road and subway. The contribution for transport management is 10% because large amount of traffic can be diverted to subway and hence the main road will provide more area for the movement of vehicles freely. In subway there are 4 lanes for two wheelers during peak hour: during non-peak hour among 6 lanes, 2 are for two wheelers and HMV. Hence the safety management will be at a percentage of 50. Hiring on energy management will be at 20% as no other sources are allowed for the traffic and environment management will be only 20%. Mudichur Road, MEPZ to Camp Road, Rajaji Road and Agaram Road satisfies this condition. Accidental management (AM chart), Transportation Modal (TM chart) and its corresponding land usage is shown in the GUI output. In TM chart 1,2,3,4 represents LMV, HMV, Auto, and two wheelers. Figures 7.9 to 7.11 also explains each road layout and produces each with different contribution. The table below shows each layout with different contribution.

<table>
<thead>
<tr>
<th>Road layout</th>
<th>Transport Management</th>
<th>Safety Management</th>
<th>Energy Management</th>
<th>Environment Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>P</td>
<td>50</td>
<td>30</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Q</td>
<td>20</td>
<td>10</td>
<td>40</td>
<td>30</td>
</tr>
<tr>
<td>R</td>
<td>20</td>
<td>10</td>
<td>30</td>
<td>40</td>
</tr>
<tr>
<td>S</td>
<td>10</td>
<td>50</td>
<td>20</td>
<td>20</td>
</tr>
</tbody>
</table>
7.5 ACCIDENT CASE

Cost of accident is an important parameter in the economic appraisal of transportation projects. Even though there are several methods of calculating the accident costs the choice of a particular method primarily depends on the objectives of the intended project and largely with national objectives. In India, very few studies have been carried out on the subject and the studies already undertaken lacked in area coverage and precise cost estimation. International analysis showed a high degree of variation in cost of accidents. It is felt necessary to carry out detailed accident cost studies for Chennai city. Accident cost need to be estimated for urban and rural areas separately.

In average the total number of accident in 2013 is 1472 for the estimated area in Tambaram. The graph Figure 7.5 below describes the accident detail which contributes due to the traffic conjunction and it is represented separately for four different layouts of the developed roads. The values of contribution for layout P, Q, R, S is given as 1030, 1324, 1178, 736 respectively. The value is determined by the following equation as,

\[
\text{Accident case} = \frac{\text{Total number of accident} - (\text{total number of accident } \times \text{SM contribution})}{100}
\]

In our method the input for the accident case is given by the numerical value 1,2,3,4, where each value represents for different P, Q, R, S road layouts respectively. Each numerical value has its own standards and if the value is given in different format the chart for the corresponding layout will not be displayed and will display out of limit in command window during processing. Here SM stands for Safety Management contribution of each separate layout and hence 4 different graph is obtained.
Figure 7.5: Accident management graph for 4 different layouts of 2013 in Tambaram

7.6 MOTORIZATION

Motorization refers to the type of traffic which flows in the lanes of 4 different type of road layout. Here the Low Motor Vehicles (LMV), Auto, Heavy Motor Vehicles (HMV), Two-wheelers are described and it is represented in the graph format. These are the data retrieved from the real time experiment and utilized to produce a bar graph Figure 7.6.
7.7 CONCLUSION

Attention must be given on the population in the precise area, width of each and every accessible road and their facility etc for the assessment of the sustainable transport in a particular urban area. However it is a hard assignment. The numbers of vehicles that pass through the road normally determine the capacity the road. We have focused on eight roads of Tambaram area, located in Chennai in our proposed paper. Width of each
road, population around the particular area, average number of vehicles in the road during peak hours, accident case and land usage in 2013 has been found out regarding these eight roads. We have acquired through the utilization of our proposed method sustainable road layout and its corresponding contribution for each and every factor such as transport management, safety management, energy management and environment management etc. The fuzzy logic concept is made use of in our procedure to provide optimal road layout. There are a total of 19 lanes in existing roads but in our proposed method there are total of 42 lanes including the pedestrian path. Consequently by our proposed method there is an increase of 23% in total lanes. A change in the mode of travel must be taken into account which focuses on increasing the pedestrian path and reducing two wheelers to travel in a short distance, and the spatial pattern of travel which is anticipated to increase the area for travelling. If we put it in another way, the spatial separation of activities and the distribution of land-uses increase the need to travel. As a result, it is essential to consider a spatial layout that can facilitate to support a better eco-friendly transport choice. The future work can be focused on developing a road which provides better contribution for all the four factors such as transport management, safety management, energy management and environment management are to be considered in our future road projects. So special attention must be paid for this purpose. The existing largest road width is 21m in Tambaram area. This road width can be increased by widening the road by removing unnecessary buildings, unwanted parking areas, roads which are left unconstructed, road side shops etc from the road. Accordingly the sustainability can be enlarged further in the future for making higher contribution in all the four parameters such as transport management, safety management, energy management and environment management. Only the government can help doing this so that the involvement for each factor can be greater than before.