Critical Study on Road Inventory and Traffic Circulation for Ensuring Road Safety in CEG Campus

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Abstract
Transportation is one of the most critical and difficult issues that university campuses face in the process of transitioning to environmental sustainability. College campuses are very distinct communities. The safety of college campuses has become an issue of widespread concern in recent years. Safety is a growing concern that must be addressed by college campuses. The importance of transportation sustainability has been gradually gaining acceptance among different organizations. Higher education institutions are adopting the concept of sustainable transportation in order to reduce their parking construction and operations costs, improve livability on their campuses, and reduce their campuses’ negative impact on the environment. In this research work the study area selected is CEG campus, Anna University. This research project has been initiated to understand the commuting behaviors and traffic patterns. The existing condition of various roads in the campus is to be surveyed. The appropriate safety measure is to be suggested for enhancing the traffic circulation within the campus. The various surveys on all basic traffic parameters would be collected and apart from this the vital links and critical nodal points are studied in detail so as to enhance the present service levels by improving appropriate traffic furniture and improvements. This study suggests recommendations, along with implementation strategies which ensure Public Safety, Parking Services, and input from the campus community. The results of this project could prove to be a useful tool to help the University to enhance the traffic circulation inside the campus by way of ensuring safety and sustainability.

Keywords:
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1. Introduction
The importance of transportation sustainability has been gradually gaining acceptance among different organizations. Higher education utions are adopting the concept of sustainable transportation in order to reduce their parking construction and operation costs, improve livability on their campuses, and reduce their campuses’ negative impact on the environment. Transportation is one of the most critical and difficult issues that university campuses face in the process of transitioning to environmental sustainability. Most university transportation systems across the nation are highly car-dependent, and higher education institutes are now facing the consequences of such systems, namely reduced safety, noise pollution, lack of land for new parking lots, and degrading air quality.

2. Stages Involved in the Study
The objective of the study is to obtain a complete inventory inside the campus and to suggest recommendations to ensure safety. Data required for studies is to be collected through primary surveys and secondary surveys. Primary
surveys includes vehicle count and road infrastructure. Secondary surveys include pavement condition and population. Population data collected is projected to future years using STELLA software.

3. Data Collection and Analysis

Traffic volume Count, spot speed survey, road inventory surveys, pavement condition survey. Traffic volume count is obtained at a selected junction. The survey data were analyzed thoroughly. The traffic data collected from the field were scrutinized and processed in computer. The Passenger Car Units (PCU) values recommended by Indian Roads Congress (IRC) were used in the analysis. This is used to know the vehicle composition.

![Volume count survey](image1.png)

Figure 1. Volume count survey.

A spot speed survey is conducted to know the speed of vehicle movement inside the campus. Spot speed is obtained at various locations inside the campus.

![Results of speed survey](image2.png)

Table 1. Results of speed survey

| LOCATION                  | SPEED km/hr | AVERAGE SPEED |
|---------------------------|-------------|---------------|
|                           | Upwards     | Downwards     |
| Towards Kotturpur-         | 38.1        | 34.9          | 36.5          |
| Towards Maintenance       | 32.5        | 31.0          | 31.7          |
| Towards SBI(I-I)          | 27.7        | 29.6          | 28.6          |
| Towards Hostel(L-L)       | 25.4        | 23.5          | 24.5          |
| Towards Canteen(J-J)      | 23.2        | 22.6          | 22.9          |
| Towards HRS(H-H)          | 30.3        | 29.0          | 29.6          |

![Figure 2. STELLA model for population forecasting.](image3.png)

Figure 2. STELLA model for population forecasting.

4. Projection using STELLA Software

Stem dynamics model is built using STELLA software for the population projection. The population data were collected from the university.

![Population forecast](image4.png)

Table 2. Population forecast

| Year  | Teaching | Labors | Helpers | Admin | Total  |
|-------|----------|--------|---------|-------|--------|
| 2013  | 652      | 184    | 100     | 295   | 1,231  |
| 2030  | 1031     | 126    | 365     | 162   | 1685   |
| Final | 1053     | 123    | 380     | 155   | 1711   |
| Vehicle forecast | 843 | 98 | 304 | 124 | 1369 |
Since students are not allowed to use the vehicles inside the campus they are not considered in the forecast. The results of population forecast reveals that the forecasted population and vehicles is very merge in horizon year and hence the campus mainly has the problem of traffic circulation, management and control aspects.

Hence it is recommended that a very strict enforcement should be exercised on speed control. In addition to that temporary traffic management measure should be implemented in all critical locations such as DnTE junction, SBI junction and near Alumni Block.

5. Conclusion

From the volume count the composition of vehicles is obtained as car-29%, TW-56%, cycle-12% and truck-1%. The speeds of vehicle at various locations were obtained. The average speed inside the campus is 29 kmph. The widths of the speed breakers were measured. The widths are 2.1m, 3m, 2.3m and 2.1m. The depth of speed breakers are 0.16m, 0.2m, 0.23m and 0.18m. The desirable depth is 0.15m. The desirable width of a speed breaker is 3.5m. Pavement condition is been obtained from visual rating. The condition of road from VC office to Environment block is given the rating 50 out of 100. The population forecast is done for the next fifteen years. The population in 2030 would be 1711. The increment will be 480.

6. Recommendations

By observing the composition of vehicles it is found that the usage of cycle is less inside the campus, so steps must be taken to encourage usage non motorized vehicle inside the campus through advertisements. The speed of vehicles is more than that of speed limit 25kmph, fixed by the institution at certain locations. The speed restriction boards must be placed at critical locations. According to IRC:103-2012, the width of footpath must be at least 1.8m. The road segments without adequate footpath must be provided with adequate footpath.

The width of all speed breakers must be increased to desirable width. It is appreciable that newly laid footpaths are of adequate width. Additional speedbreaker must be provided opposite to SBI Bank to reduce the approaching speed near the junction. The road segment from VC office to Boys hostel must be repaired or laid. The set back of kotturpuram junction is found to be inadequate and the calculated set back must be applied at the junction. It is preferred that the illegal auto stand outside the gate must be removed.

By implementing these recommendations the campus can bringout safety of pedestrians and motorists, comfortable ride inside the campus and promote non motorized vehicle inside the campus.

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