# Curb the Growing Menace of Traffic Problems in Kurnool City

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**Abstract.** Traffic jam, which has been becoming worse in most parts of the world, developed or not, has posed an imminent threat to the quality of urban life. Its main symptom is a slow decline in traffic speeds when contrasted with an uninterrupted flow, which lengthens travel times, increases fuel consumption, other operating expenses, and pollute the environment. Most cities in countries like India are dealing with a variety of issues as a result of the rapid urbanization and abrupt rise in private transportation. Urban road congestion is a problem for India's car stockpile and has a variety of repercussions on urban economies. Smart information and traffic control strategies are needed to combat the severe issue of increasing and current traffic jam in Indian cities, which can then lower traffic congestion and raise demand for public transportation. Kurnool city has witnessed a tremendous growth in traffic, in recent years. Coupled with poor condition of roads in the town, the growing traffic volumes have resulted in posing several problems to the population of the town. The number of auto rickshaws plying in the town has gone up by more than 200% in the last 5 years period; one reason is being the growth of the educational institutions in sub-urban areas. The increase in the number of 3 wheelers used in the town has been authenticated by the data, collected from the Regional Transport Authority of Kurnool. Taking the figures and data into consideration, measures are being proposed by the institution control, up to the extent possible the problems of traffic in the Kurnool city.

**Keywords:** Autos, Traffic, Population, Roads, Weekly Holiday, Pollution.

## 1 Introduction

A strong and effective transportation system benefits people, businesses, and the environment right away and accelerates the country's economic growth [1, 2]. On the other hand, traffic congestion is impacted by larger vehicles and increased transportation activities. Generally speaking, traffic congestion occurs when demand for travel outpaces available road capacity [3].


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The majority of cities worldwide have faced significant challenges in maintaining a sustainable transportation system due to traffic congestion. Because it takes longer to travel, congestion lowers accessibility and raises travel expenses. Significant negative consequences of congestion exposure include higher pollution of noise, driver stress, lower mental contentment, slower city economic growth, and more passenger time pressure [4]. In addition, congestion has a negative impact on the environment by increasing emissions of air pollutants and fuel usage. The quality of rural and urban life is unquestionably threatened by traffic congestion, which has been growing in both urban and rural places worldwide, developed or not, and will only get worse [5-7]. Due to its increased consumption of energy, road collisions, pollution of environmental, and travel times, traffic congestion is seen as one of the main obstacles to sustainable urban growth. Traffic slowdowns, longer travel times, increased fuel consumption, pollution, and other expenses are its main manifestations [8]. As the situation worsens, the first step in any policy-making process is to estimate the financial impact of traffic delays on the entire national economy. Furthermore, a very popular and successful traffic demand control technique is the imposition of a value on road users based on estimates of delay costs [9].

At the moment, it is difficult for transport engineers and urban planners to come up with ways to reduce the effects of traffic congestion without endangering passengers' mobility. In this context, it is necessary to evaluate the situation of traffic congestion by taking into account the elements that contribute to it, trip time, mobility patterns, and traffic conditions [10]. One common explanation for traffic congestion is the deterioration of the physical transportation infrastructure, such as roads, highways, and bridges. However, traffic is also partly to blame for quickening the physical deterioration of transportation infrastructure, which lowers the recital of the transportation network.

Despite the development of a number of recovery techniques to restore the recital of the damaged network, the majority of these techniques are insufficient or may not even be appropriate in situations involving heavy traffic volume [11-13]. Road traffic congestion must be addressed through multidisciplinary mitigation measures in order to guarantee a resilient and sustainable transportation system. Government, private, and public sector policymakers, researchers, and practitioners have been making multiple initiatives to reduce congestion-related losses for many years. Building an efficient traffic control management system is known to begin with appropriate traffic condition monitoring. By doing this, the levels of congestion may be quickly measured, and precautionary measures can be started before the hours when traffic is at its worst. When creation plans for traffic control during special events, it might also be helpful to measure potential congestion [14-17].

Researchers, those who make decisions and experts of transportation have been striving for years to develop a variety of assessment methods to accurately gauge traffic congestion. Numerous performance metrics, such as speed, trip time, delay, service level, and other indices, are being used to calculate traffic congestion. However, there isn't yet a universal method for evaluating traffic conditions. [18-19]. Congestion is a worldwide issue that makes it difficult to make a strong and sustainable transport system. The long-term goal of this research is to minimize the negative socioeconomic and environmental effects of traffic by supporting the development of a strong and sustainable transportation management system. Before launching, a number of road traffic assessments from different perspectives need to be conducted. Monitoring traffic flow in a particular area is one of the first steps in developing an efficient traffic management system or easing congestion.

Different policies are implemented in many nations, even within a single state. The average peak travel time was utilized by the Washington State Transportation Department in their 2006 congestion report [19], and The Roadway Congestion Index, for instance, was utilized by the Texas Transportation Institute in their 1994 urban mobility report [20]. China's Ministry of Public Security chose a municipal road's average travel speed to illustrate the state of traffic. Congestion hours, travel time index, and planning time index were all used by the U.S. Department of Transportation (DOT) in their annual congestion trend reports from 2016 to 2018 [21-23]. With so many different measures available, it might be difficult to choose the best one to use in a road traffic analysis. The current study focuses on using the Weekly One Day Off Method to reduce traffic in Kurnool, Andhra Pradesh, India.

## 2 Methodology

### 2.1 Study Area

In India, Kurnool is a city in the Andhra Pradesh state. Andhra State's capital was located there from 1953 to 1956. The city, which is situated on the banks of the Tungabhadra River at 15.8333° N, 78.05° E, is well-known as "The Gateway of Rayalaseema" and is the sixth most populated city in the state.

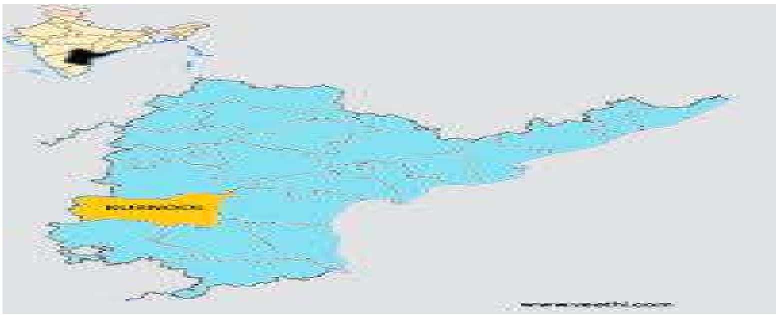

**Fig. 1.** Map of Kurnool City

## 2.2 Data about Auto Rickshaws in Kurnool Town

Number of autos registered by the RTA, Kurnool : 18550
Number of autos registered by the Traffic Police in Kurnool :12862

A Technical survey was conducted for arriving at the actual figures related to distance covered, money earned, fuel consumption and effect of pollution. A sample size of 250 was selected covering strategic locations in the town. The police records including FIRs filed in the various police stations of Kurnool town have been used to procure the information about the fatal/nonfatal accidents. The survey yielded the following results.

## 2.3 Results of Survey

Average amount earned by the auto driver per day :Rs 350
Average distance travelled by auto per day :100 km
Average mileage per auto per liter :25 km
Noise pollution by auto :80 db

**Table 1.**Properties of Air pollution as per Traffic pollution record and APPCB

| S.No | Parameter | unit | Value |
|---|---|---|---|
| 1 | Co | gm/km | 4.8 |
| 2 | HC+NOx | gm/km | 2.4 |
| 3 | PM10 | µg/ mt3 | 2.5 |
| 4 | NOx | µg/ mt3 | 10 |
| 5 | SO2 | µg/ mt3 | 6 |

## 2.4 Data Related to Accidents

**Table 2.** Number of Accidents as Per FIR (Sep 2014 –October 2015)

| S.No | Parameter | unit | Value |
|---|---|---|---|
| 1 | Co | gm/km | 4.8 |
| 2 | HC+NOx | gm/km | 2.4 |
| 3 | PM10 | µg/ mt3 | 2.5 |
| 4 | NOx | µg/ mt3 | 10 |
| 5 | SO2 | µg/ mt3 | 6 |

## 2.5 Projected Growth In Population Of Auto Rickshaws ( Next 5 Years)

Considering an average growth rate of 10%, on annual basis the expected number of auto rickshaws at the end of the next 5 years period, in Kurnool town is calculated as below.

Number of Registrations autos for every year : 1200
Number of estimated increase for the next five years (1200*5) : 6000
Number of total autos for the next five years (18550+6000) : 24550

The figures arrived at indicate a compounding of traffic problems in the Kurnool town over the next 5 years period. A study of comparison with other major towns/cities of Andhra Pradesh would reveal that the Kurnool town has the highest ratio of number of auto rickshaws per population. The following table compares various densities with the population of major towns/cities.

**Table 3.** Comparison of Kurnool Town Autos with other Cities / Major Town Autos of Andhra Pradesh

| S. No | City/Major town | Population (As per 2011 Census) | No. of Autos Registered | Density (population/ autos) | Ratio (%) (autos/population) |
|---|---|---|---|---|---|
| 1 | Kurnool | 4,30,214 | 18550 | 23.15 | 4.34 |
| 2 | Vijayawada | 10,34,358 | 20,000 | 51.71 | 1.93 |
| 3 | Tirupati | 2,87035 | 11,859 | 24.20 | 4.13 |
| 4 | Guntur | 6,47,508 | 15,000 | 24 | 4.16 |
| 5 | Viskapatanam | 17,28,128 | 20,000 | 86.40 | 1.15 |
| 6 | Rajahmundry | 3,41,831 | 10,000 | 34.18 | 2.92 |
| 7 | Kakinada | 3,12,538 | 7,0000 | 44.6 | 2.24 |

The same data has been represented in the form of a Pie chart

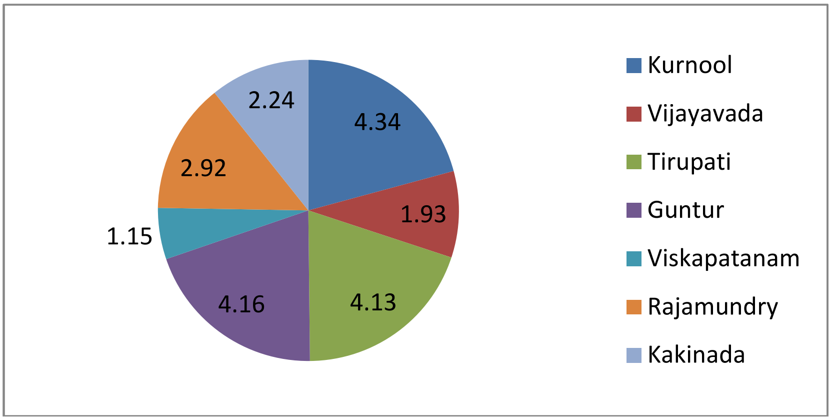


**Fig. 2.** Comparison of auto rickshaws ratio with other cities

## 3 Proposed measures to Control the Traffic related problems including Accidents

Taking the above figures and data into consideration the following measures are being proposed by the institution control, up to the extent possible the problems of traffic in the Kurnool town.

### 3.1 Stopping Registration

This may result in a public outcry and seems not feasible under the circumstances. An alternative method proposed, which would be more effective and likely to give the results is illustrated below.

### 3.2 Weekly one day – off method

The figures used in the method, illustrated below, are obtained from Police and Transport Officials of Kurnool. The method aims at calculating the change/difference in the income of an auto rickshaw driver operating 8 hours on an average per day.

### 3.3 Detailed Calculation

- Number of autos registered by police : 12862
- Number of autos weekly one day holiday (12862/7) :1837
- Number of remain autos that run in a day (12862-1837) :11025
- Income per day for an auto driver :Rs 350
- Income per week for an auto driver :Rs 2450
- Loss of income due to holiday : (350*1837) :Rs 6,42,950
- Income increased for remaining autos (642950/11025) :Rs 58
- Income per day for remain auto due to weekly holiday (350+58) :Rs 408
- For working 6 days one auto income earned (6*408) :Rs 2448

The calculations shown above would indicate that there is no change in the income earned by an average auto rickshaw driver operating in the town. Besides the unchanged income the method is likely to result in saving of precious fuel, the details which are shown below.

### 3.4 Saving of Fuel by Weekly One Day Off Method

- Number of autos weekly one day holiday : 1837
- Average distance travelled by auto per day :100 km
- Number of kilometers not running by autos per day due to holiday (1837*100) : 183700
- Average mileage per auto per liter :25 km
- Total Fuel saved per day (183700 /25) : 7348 liters

### 3.5 Benefits of Weekly One Day off Method

As the above figures reveal, the method if implemented would not result in a lowering of income on the part of auto rickshaw drivers, but would result in easing of many traffic related problems, besides saving precious fuel. Some of the tangible and intangible benefits include

- Reduced traffic congestion at important junctions.
- Reduced levels of noise pollution

- Control of air pollution
- Likely saving of fuel of about 7500 liters per day.
- Improvement in health condition for auto rickshaw drivers

### 3.6 Method of Implementation Of Weekly One Day Of Method

The method would stipulate a schedule for all the 7 days of a week. The registered numbers of auto rickshaws, which are given off on a particular day are tabulated below.

**Table 4.** Schedule for weekly one day off method implementation

| Day | Registered numbers of Auto rickshaws given off | |
|---|---|---|
| | From | To |
| Monday | 1 | 1837 |
| Tuesday | 1838 | 3671 |
| Wednesday | 3672 | 5512 |
| Thursday | 5513 | 7349 |
| Friday | 7350 | 9186 |
| Saturday | 9187 | 11024 |
| Sunday | 11025 | 12862 |

### 3.7 Steps to be implemented for making the method effective

- **Marking of the Auto rickshaws:**

Every auto rickshaw in the town must display, in the rear side, the number allotted along with the day of off specified for that auto rickshaw.

- **Creation of awareness among auto rickshaw drivers:**

Wide publicity about the method/ programme is to be given and the drivers must be made to realize the implications of the implementation of the method

- **Corrective actions in case of violation of the rules:**

Any driver, who is found violating the rules is to be fined an amount of Rs. 1000/- only, to enforce the implementation strictly. The informer of the any violation must be given an amount of Rs. 200/- from the fine collected. The police men who are on duty at that location must be paid an amount of Rs. 200/- as an encouragement for strict enforcement of the method. The remaining Rs. 600/- must go to the Government exchequer.

### 3.8 Limitations/ Drawbacks

As is the case with the implementation of any method of traffic control, this method also has certain limitation. These are identified as; Auto rickshaws carrying School going children, Auto rickshaws carrying patents in medical emergencies.

## 4 Conclusions

The proposal out lined above, would give better results if implemented according to the plan. The cooperation of the police and transport authorities and most importantly the auto drivers is essential for the successful implementation. It is hoped that all stake holders would show active interest in controlling the growing traffic problems associated with a growing town like Kurnool.

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