#### ALTERNATE TECHNIQUE FOR WIDENING ROADS NEAR COMERICAL PLACES

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#### Abstract

It is well known that as volumes of traffic progressively increase, the need to widen roads becomes increasingly urgent especially near commercial markets. In this paper we will discuss the technique for widening roads; usually roads are widening by clearing nearby buildings. But that is very costly. This paper discuss that usually near commercial or market places there is always horizontal parking space, so if we just shift this parking space underground (under main road) with proper drainage system and stairs at each end of the road we can easily secure 1 or 2 extra lane. That extra lane can be used for bus rapid transit or just for normal traffic. By this arrangement pedestrian can also find easy to cross roads. Also in this paper alternate ways of lighting in underground parking during day and night by solar panels.

Key words: widening roads, underground, lighting.

#### Introduction

Rising traffic congestion is an inescapable condition in large and growing metropolitan areas across the world. In big cities traffic situation is worse especially near market or commercial places. This is due to increasing volume of traffic per year with growing population. In order to accumulate this increasing volume of traffic existing roads are widened. Normally the road widening on the section would involve removing the existing emergency lane, prior to installation of a new lane and then lane widening with a new emergency lane. This widening would be laid as a 100 per cent new road by excavating a new formation and then creating the two lanes with exclusively new materials, but it makes more sense to use the materials already in the existing emergency lane [1]. Another method is to clear nearby existing building and making space for extra lane and follow the normal pavement methods. Both methods are very effective but first method cannot be applied near commercial places where roads are packed by commercial buildings. We have to apply second method, which seems very expensive. So we have to find some economical and effective solution to this problem. Basic idea of this paper instead of clearing space we apply alternative technique which is rather less expensive. Usually near market place there is horizontal parking space for cars, then just we swift these parking space underground by providing drainage system and access for cars to go and leave this underground parking plus stairs on each ends for pedestrian to easily move one side to another. By this we can secure one or two extra on each side depending on the space available. This extra lane can be used for rapid transit or just extra lane for normal traffic flow. Also, alternative to this clear PVC pipes be used for drainage from main road, because it will provide sunlight to pass for lightening underground during day and by placing solar panels near the sides of the roads to providing electricity for lightening during night. Another advantage of this method is it will provide more parking spaces for both commercial and residential usage.

#### What is traffic congestion?

At its simplest, it can be explained in physical terms as the way in which vehicles interact to impede each other's progress. These interactions and their influence on individual journeys usually increase as demand for the available road space approaches capacity or when capacity itself is reduced through road works or

closures for example. In addition, one-off events such as bad weather or road traffic accidents can also have a significant bearing on congestion [2].



Figure 1: Traffic congestion at Price Majed Street Jeddah Saudi Arabia [3].

Traffic congestion and cities, it seems, go hand in hand. Everyone complains about being stuck in traffic; but, like the weather, no one seems to do anything about it. In particular, traffic engineers, transportation planners, and public officials responsible for metropolitan transportation systems are frequently criticized for failing to make a dent in congestion. [4]

## **Effects of traffic congestion**

Increased traffic congestion has both economic and environmental effects, however some of the common effects are:

- Slower speeds
- Longer journey times
- Increased queuing at junctions or bottlenecks
- Increased stopping and starting
- More time spent stationary
- Less predictable journey times. [2]

## Traffic congestion problem near market places

Traffic situation near markets has been worsening with increasing development, especially during peak shopping hours. During Christmas or Ramadan traffic jam pack near market places. Some of the reasons for this congestion are lack of parking facilities so people parked illegally creating traffic blockade. And also lack of effective parking system near markets that are legal. (See fig 2).



Figure 2: Vehicles being parked in front of the city's New Market which may cause huge traffic congestion in Dhaka.

Another reason for this traffic problem is volume of traffic is large as compare to width of the road.

### **Possible solutions**

One of the solutions to traffic congestion is to build overhead bridges at every signals or underpass just like in Jeddah and Riyadh Saudi Arabia (see fig 3). Second is to decrease the vehicles issued per year. Both of the solutions are quiet well but economically first one is too much expensive and is not for long-term and also destroyed the aesthetic of the place and is not pedestrian friendly. Second one is also quiet effective but problem is it will take a lot of time to enforce these kinds of laws in developing countries like Pakistan.



Fig 3: Underpass in Riyadh, Saudi Arabia [4]

Shifting parking space underground

Near market places roads are widening by clearing nearby buildings and buying the nearby lands by government or concern authorities. Cost for this method includes land costs plus costs for clearing building plus building pavement for extra lane. This method is also not effective in the sense of cost and a lot of time is required. So, there must be an alternative solution for this problem.

## **Basic concept behind the solution**

As discussed before near commercial market places there are usually horizontal car parking slots just adjacent to shops. Basic idea of this paper is to shift this parking space underground by accessing main road to underground parking after intervals (see fig 4). By this concept parking space is doubled and extra 1 or 2 lanes of minimum width of 3.0 meters would be freed up for the vehicle usage. With the road widened from this concept traffic may pass easily and more volume of traffic may pass results in reducing traffic congestions.

## Drainage

Drainage system uses clear (transparent) PVC pipes from the grates to the column. Then after that normal PVC pipes are used up to the drainage facility. Separate drainage system is preferred means different inlets and pipes connection to drainage facility for both main road and underground area. This is because to provide fast and effective drainage facility both for main road and underground area.



Figure 4: Shows the underground parking + extra lane for vehicles usage + solar panels + stair case on both ends of the road.

### **Stair Cases**

As shown in fig 4 and fig 6 stairs are provided on both ends of the road. This facility is provided give pedestrian to cross road easily and also provide facility for persons enter or leave who have parked his/her car.

## Extra Lane Usage

Once this formula is in use and road is widened thus creating extra lane. Question arises of its usage. It can be put into following use:

- 1- For increased volume of traffic it can be simply used for vehicular traffic for easy passage of traffic.
- 2- To increase public transport network by reserving this extra lane for Rapid Transit System.
- 3- Can be reserved for bike or cyclists for increased safety.

# Lighting

As mentioned in pervious section that clear PVC pipes are provided. These are provided due to from this Type of pipes light can easily pass and can provide sufficient light during day time to underground facility without requiring extra energy. Solar panel is provided at each end of road (see fig 4 and 6). These are providing to light up the underground facility during night.



Fig 5: Clear PVC pipe



Fig 6: top view with blue color marked as solar panels.

# Advantages

- 1- Extra lane pavement cost is saved
- 2- Electricity costs are saved
- 3- Pedestrian friendly
- 4- Aesthetically appealing5- Market friendly
- 6- Better parking facility

### Conclusion

Although this method is very cost effective than other methods but by building an underground facility would create drainage problem. Because no matter how much effective your drainage system underground facilities are flooded when rainfall increased certain limits. But this type of facilities beautifully creates the best possible solution for parking problem near market places.

Also this type of project is aesthetically appealing than all other methods for widening roads. Moreover this method is not only for widening roads near market places but can also be used effectively in other places. So, more research should be conducted to make it more usable.

### References

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