"The Samiul Turn": An Inventive Roadway Design Where No Vehicles Have to Stop Even for a Second and There is No Need for Traffic Control

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***Abstract* — One of the most challenging and complicated issues in city management for most countries of the world is the traffic problem. It is a very common phenomenon in almost all the world's cities. Due to high traffic congestion, a substantial portion of working hours have to be left on streets which indirectly has an adverse impact on the economy of a country. Moreover, it causes serious air pollution, and noise pollution thus worsening the overall environmental condition. An adequate and efficient transportation system is a prerequisite for the sustainable economic development of every country. The main purpose of this paper is to introduce a new roadway design and the name of the roadway design is "The Samiul Turn". If a country implements "The Samiul Turn" roadway system on their roadway, it can eliminate the traffic congestion problem. The author of this paper is the designer of "The Samiul Turn" roadway system.**

***Keywords* — Roadway, The Samiul Turn, Traffic Congestion, Vehicle.**

I. Introduction

Urbanization is a global phenomenon and is occurring at a rapid pace in the least developed countries of the world. Rapid and ongoing urbanization has resulted in extreme levels of traffic congestion within a country's urban areas and tremendous demands on infrastructure and service provision.

So, there is nothing new to say about the traffic congestion that has reached dangerous levels in most of the world's busy cities. Millions of people are losing their precious time due to traffic congestion.

Much more fuel is being burned than needed every day. Carbon and other harmful substances are produced by burning fuel to pollute the environment. The whole world is affected. Ambulances, fire service vehicles, or other emergency vehicles are not exempt from traffic congestion. Is there any way to save ourselves from this problem? Yes, there is. This paper is going to introduce a solution to the world for releasing from traffic congestion.

II. Objectives

The specific objectives of this study are:

- Analyzing the reasons behind traffic congestion.
- To find solutions to traffic congestion.
- To introduce an innovative roadway design called *"The Samiul Turn"* that could be a potential solution to traffic congestion for the world's new generation of urban dwellers.

III. Methodology

This research is explanatory in nature. Research design includes the collection of data from personal observation by traveling to many cities. Both theoretical and empirical studies were taken into consideration in this work. To solve the traffic congestion of various megacities of this world, this paper has worked to develop an innovative road design that is definitely going to solve the traffic congestion.

IV. Causes of Traffic Congestion

In the U.S., drivers lost an average of 36 hours in 2021 due to congestion. [1] Drivers in London spent an average of 156 hours stuck in traffic during 2022. [2] Traffic congestion occurs when the demand for roadway travel exceeds the supply of roadways. [3] When one or more vehicles stop on the road, traffic congestion is created. There may be some minor causes of traffic congestion. These are exceptional like road accidents, sudden movement of laborers, etc. These are negligible and not a regular phenomenon at all. The main cause of traffic congestion is "Danger Cross".

V. What is Danger Cross

A danger cross is such a junction or cross point where a collision may occur between two or more vehicles if they move simultaneously. The danger cross is seen in ordinary road junctions and in ordinary "U Turn".

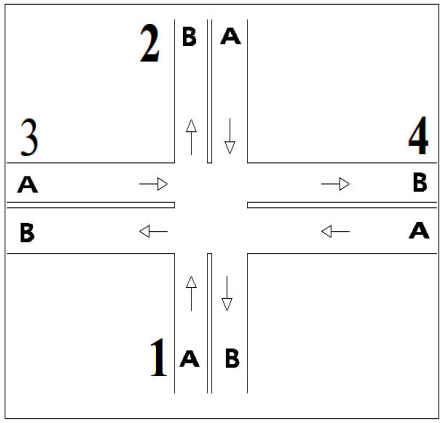

Fig. 1. Danger Cross.

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In the ordinary junction system, some vehicles are stopped to keep some other vehicles running and traffic congestion is created. As an example, we consider the Fig. 1. Here roads 1, 2, 3, and 4 have coincided at a point and created a junction. Each road is divided into two Lanes **A** and **B**. The vehicles enter the junction through lane **A** and leave the junction through lane **B**. There are a total of 8 lanes here. Each lane may also be divided into one or more sub-lanes. When a vehicle enters the junction from lane **A** of road 1, then no vehicle can enter from 2, 3, and 4. If enters, a guaranteed collision will occur.

So, it is a "danger cross". When a vehicle enters the junction from Road 2, then no vehicle can enter from 1, 3, and 4. Similarly, an unvarying effect could be seen across the figure (in all lanes). So, it can be seen that if the traffic is moving from one road, the traffic is stopped on three roads. As a result, traffic congestion increases by rotation. If the number of vehicles at the intersection or the number of roads increases, traffic congestion also increases.

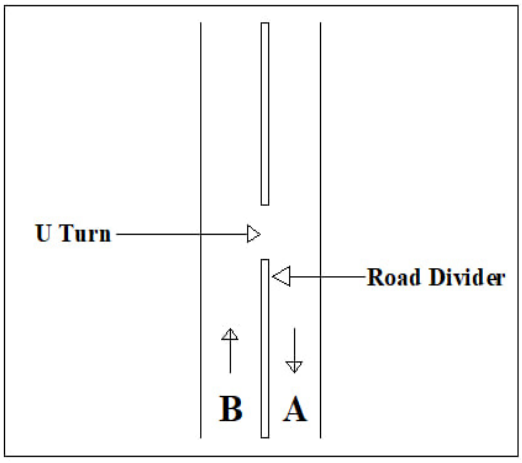

Fig. 2. Ordinary "U-Turn" Point.

Another danger cross is seen in the ordinary "U-Turn" point. As an example, consider the Fig. 2. Here a road is divided into 2 lanes. Say, lane **A** and lane **B**. Vehicle moves towards a direction through lane **A** and moves towards the opposite direction through lane **B**. Suppose, a vehicle is moving in lane **A**. It wants to go in the reverse direction or wants to go in lane **B**. For this, it has to move very slowly through the cut portion of the road divider. During its turning, if other vehicles running in lane **B** move straight forward, then there will definitely be a clash.

So, they have to stop and traffic congestion will be created. Similarly, when vehicles moving in lane **B** want to change their lane through a cut portion of the divider, vehicles that were moving in lane **A** cannot go straight forward. They have to stop entirely. Thus, when more vehicles change their moving direction or lane, the intensity of traffic congestion will be increased seriously.

VI. "The Samiul Turn" Roadway System

"The Samiul Turn" roadway system named by the author of this paper is given in Fig. 3.

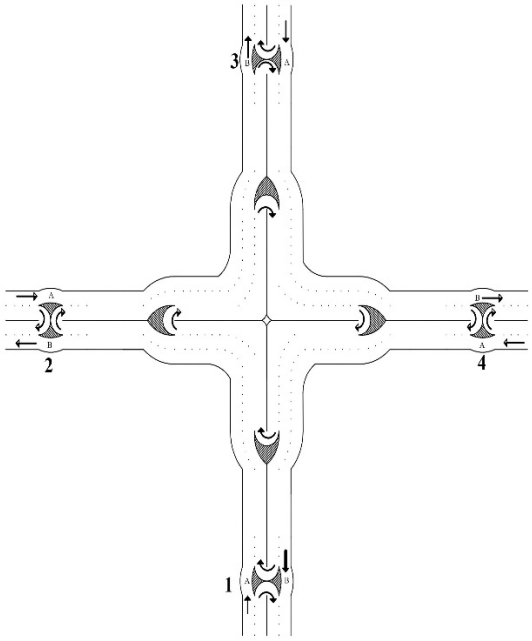

Fig. 3. The Samiul Turn.

VII. Description of "The Samiul Turn" Roadway System

"The Samiul Turn" roadway system has 4 lanes and does not intersect at any point. Each road is divided into two lanes A and B. There is a total of 12 "U-Turns" installed in this roadway system.

If a vehicle comes from lane 1(A) and wants to go back, it must use the first U-Turn. If it wants to go to lane 2(B), it has to use the left side of the road and thus it goes directly to the left. If it wants to go to lane 3(B), it has to take its first U-turn at segment 2(B) and then it goes directly to lane 3(B) using the left side of the road. If it wants to go to lane 4(B), it has to take its first "U-Turn" at the middle portion of lane 2 and then it has to take its second "U-Turn" at the middle portion of lane 3 and finally, it goes directly to lane 4(B)using the left side of the road. Similarly, if a vehicle comes from A in the remaining lanes 2, 3, and 4, those vehicles will follow the same rules in lane 1(A).

VIII. Comparison of "The Samiul Turn" Roadway System with Flyover

Nowadays flyovers are being used haphazardly to ease traffic congestion. But unfortunately, the traffic congestion often builds up to the flyover. There may remain a "Danger cross" at some distance from the flyover. The vehicle stops at that cross and the next vehicle thus moving also stops behind the previous one. Thus, the number of moving vehicles stops beyond each other and the tail of stopped vehicles increases up to the flyover. Usually, flyovers are constructed at an intersection where three or more roads meet each other. On the other hand, "The Samiul Turn" roadway system can completely eliminate traffic congestion.

TABLE I: COMPARISON BETWEEN THE FLYOVER AND "THE SAMIUL TURN" ROADWAY SYSTEM

Issue	Flyover (Overpass)	"The Samiul Turn" roadway system
Required amount of land	Huge	Less
Construction Time Required	Longer (Several Years)	Less (Several days)
Suitable for driving vehicles	Only some types of vehicles	All types of vehicles
Construction Process	Complex	Easier
Possibility of accidents in vehicles	High	Low
Eliminate traffic congestion	Cannot eliminate fully	Can eliminate fully
Construction Cost	Very high	Comparatively less than the construction of flyovers
Civilization	Brings civilization backward	Brings civilization forward
Beautification	Decrease	Increase

IX. COMPARISON OF "THE SAMIUL TURN" ROADWAY SYSTEM WITH ROAD WIDENING

Some planners recommend road widening but, this is an expensive method. It consumes a huge amount of resources but cannot completely eliminate traffic congestion. In some cases, traffic congestion increases instead of reducing. If the road is widened, more vehicles will travel on this road and more cars will stop at the "Danger Cross" thus increasing traffic congestion. Widening the road without solving the 'Danger Cross' problem will increase traffic congestion instead of reducing it.

On the other hand, "The Samiul Turn" roadway system takes very little support and according to this system total a number of 12 "U-Turns" are sufficient to remove traffic congestion completely.

X. COMPARISON OF "THE SAMIUL TURN" ROADWAY SYSTEM WITH METRO RAIL

Metro rail can be built under the ground, surface of the ground, or over the ground but, construction of metro rail under and over the ground is very much expensive and complicated. So, some planners may think about surface trains but, it is another expensive and failed system. A long rail line passing through a city will cut a large number of roads. At each of these cutting points "Danger Crosses" will be created and cause traffic congestion. But "The Samiul Turn" roadway system does not have these problems and can easily decongest traffic.

XI. SYSTEM BENEFITS

If a country implements the **"The Samiul Turn"** roadway system, it will gain the following benefits:

A. Fuel will be Saved

In the bigger cities, a large volume of fuel is burning for vehicle running. This quantity is several times greater than the ideal need. By reducing traffic congestion by implementing this roadway system, vehicles will take less time to cover the distance and fuel consumption will likely be reduced by one-third or less. This saved fuel can be used to fill up the other requirements of that country.

B. Pollution of the Environment will be Decreased

A huge amount of carbon and other toxic chemicals are being mixed into the environment every day. They are produced by the combustion of fuel in vehicles and pollute the environment. If traffic congestion is reduced by implementing "The Samiul Turn" roadway system, fuel consumption will also be reduced. This will especially reduce air pollution in the city.

C. Street Accident will be Decreased

Time is wasted in traffic. Many drivers overspeed to make up for lost time. This often causes drivers to lose control of their vehicles. They fail to slow down at the right moment to turn or stop the vehicle. As a result, this accident happened. If "The Samiul Turn" is installed in the city or town, road accidents will be reduced.

D. No need for Traffic Police

The present junction system is of danger cross. Previously it has been seen that collision occurs between two or more vehicles in the "danger cross" if they want to move simultaneously. Traffic police are engaged to ensure discipline in the "Danger crosses". But there is no "Danger cross" in the "The Samiul Turn" roadway system. So, no traffic police are required in this system. Many traffic policemen will be relieved of "Danger Cross" duties.

E. No need for Signaling

There is no "Danger cross" in the "The Samiul Turn" roadway system. No vehicles should stop here. So, this system does not require any signaling on the road.

F. Journey will be Comfortable

A city has a large number of commuters every day. The city has a fixed number of vehicles to carry them. Accordingly, a vehicle has to carry an average number of passengers per day. Traffic congestion reduces the number of trips. Hence an additional number of passengers have to be carried on each trip and this creates an uncomfortable situation. Reducing traffic jams will increase the number of trips and reduce the number of passengers per trip. So, travel will be comfortable.

G. Prevention of Global Warming

Global warming is now a debatable topic, and it has bad effects on the climate. The climate is changing rapidly due to global warming. Fuel-burning in vehicles and industries generates excess heat and disturbs the thermal balance of nature. As a result, chaos has arisen in nature. If traffic congestion is reduced by installing "The Samiul Turn" roadway system, a vehicle will have to spend less time on the road, and thus, less fuel will be burned, and heat generation will be reduced.

H. Urbanization will Expand

A large number of people live in a city because it provides job opportunities, education, medical facilities, etc. People try to live at the closest distance from their workstation and this kind of trend is seen in everyone.

Because, if they are far away, they will fail to reach their workstation on time. Thus, population density in a particular area increases. If there is no traffic congestion, there will be no demand for people to live in remote areas. They can live in neighboring districts and attend their workstations on time and thus urbanization will spread.

I. Population Density will Decrease in Urban/Urban Areas

In urban areas, people live near their workstations due to traffic congestion, and thus, the population density in a particular area increases. By establishing "The Samiul Turn" roadway system, there will be no traffic congestion, people can live far apart and thus the population density in a particular area will decrease.

XII. Conclusion

"The Samiul Turn" roadway system proposed in this paper consumes little resources but provides a congestion-free country. If any country in the world wants to implement this roadway system in their cities, they can get rid of traffic congestion. If this system is followed in any city, no vehicle will have to stop even for a second and there will be no need for traffic police.

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