In today's highly paced dynamic world, urban metro cities in all countries are undergoing rapid changes in their traffic and transportation management systems. Manual controls are becoming obsolete as they are incapable of handling the fast increasing volume of traffic, the result, traffic disruption on the roads for hours causing huge loss of man-hours and increase in auto emission pollution of the urban environment. Residents are suffering from various types of respiratory ailments and getting exposed to more dangerous disease like cancer, Alzheimer, tuberculosis etc. All these ill effects can be reduced drastically through Automation of the Traffic controlling systems to ensure smooth flow of traffic on busy and sensitive locations. Interconnected intelligent electronic lighting systems have improved the traffic handling work considerably but have failed to collect lot more data and analyze them to take remedial action. With the invention of Fiber Optic cable sensors and use of Laser light beams, the traffic management system has improved drastically. In the following paragraphs, these will be explained in details. At this stage, the theory on functioning of Fiber Optic technology will not be taken up as these are available in plenty in published books, research papers and internet. So, interested readers may go through these documents to know more about the theories. Instead, most of this paper and presentation will be devoted to the study of traffic in a certain location and identify the various problems that are causing the traffic disruption, identify the equipment and gadgets to be installed, construction management programs and subsequent maintenance of those equipments to ensure their 24x7 uninterrupted operation. Fiber Optic cable sensors and laser technology generates huge amount of field data and information on the number and type of vehicles passing through the location under Real Time Monitoring, vehicle speed, lengths, axle weight, road lane capacity, lane capacity being utilized and available as spare for diversion to ease congestion etc. These date and information need to be put together and analyzed to take urgent action. For this, a dedicated team of professionals shall be deployed at the sites with all controls at their finger tips. At this session, case studies on a metro city Kolkata in India, the system design and installation of a Fiber Optic Intelligent Traffic Control protocol will be discussed. This brief is a suggestion and guideline that can be applied for a busy metro city anywhere. A satellite map of the city’s central business district and the suburbs shown. A 45 km diameter area has been taken into consideration. All traffics entering into the central business district will be generated or come from this area. For this a central traffic control centre and four satellite control centers have been designed. All information from these satellite centers will be transmitted to the Central station through Fiber Optic Caballing fitted with sensors and also through UHF telecommunication. The following data will be collected at the satellite traffic centers.

1. Origin and Destination Survey of all types of vehicles- Manually
2. Speed of the Vehicles at the entry and exit of the satellite check points
3. Time taken to cover the specified distance
4. Length, wheel base and axle load of each vehicle
5. Lane capacities in terms of vehicles per hour or per day
6. Vehicle density during peak and offbusiness hours

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Some preliminary calculations will be done to justify why these information are important for effective traffic movement control.

**Figure 1:** Calculation of Safe Braking Distance between Two Racing Cars on the Small Lane

Some preliminary calculations will be done to justify why these information are important for effective traffic movement control.

Within the city business district as marked below, the maximum achievable vehicle speed recorded by digital video recorder, cannot exceed 30 kmph which is nearly equivalent to 20 mph. At this speed, $D = 14.8$ m say 15.0 m on asphalt topped road. Again when the driver realises the need to stop, his perception time = 0.5 sec, reaction time = 0.5 sec and braking time = 1.0 sec, total = 2 secs during this time the car travels 18.0 m. So the total distance from perception time to dead stoppage of the car to avoid collision = 33.0 m. Keeping some margin for reduced tyre pressure and wind resistance this can be reduced to 30.0 m at 20 mph speed.

**Figure 2:** Traffic Monitoring Distance

**Figure 3:** Temperature and Strain Profile along Optical Fiber

To collect and analyze various information and data in respect of number of vehicles during peak and off-peak hours, strains and temperature generated by movement and braking of vehicles on the road and road capacity utilization, a fiber optical laser sensor can be installed under the road surface as a closed loop system of approximately 40 kms length to cover the core area of the Central Business Districts. The arrangement is shown in the above sketch. When all these figures are available, it becomes easy to design the Intelligent Traffic Management System.

**Figure 4:** Temperature and Strain Profile along Optical Fiber

**Figure 5:** Difference between Lane Separation

To collect and analyze various information and data in respect of number of vehicles during peak and off-peak hours, strains and temperature generated by movement and braking of vehicles on the road and road capacity utilization, a fiber optical laser sensor can be installed under the road surface as a closed loop system of approximately 40 kms length to cover the core area of the Central Business Districts. The arrangement is shown in the above sketch. When all these figures are available, it becomes easy to design the Intelligent Traffic Management System.

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