ISSN No:-2456-2165

An Overview on Indian ITS & Foreign ITS to Develop ITS in Nagpur City

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Abstract:- The improvement of traffic is the severe problem all around the world. Intelligent Transportation System (ITS) helps us to overcome these problems with the help of new systems & technologies. Intelligent Transportation Systems works with help of computer, electronics, and telecommunication technologies and management plans in an incorporated manner to provide traveler the increase in the safety and good efficiency on the road & transportation systems provided on the road, to manage and supervise the traffic congestions. In the present study we have studied the technologies of the Intelligent Transportation System. The Objective of the paper is the Study of intelligent transport system in the human race and match up to with Nagpur intelligent transport system. Hence structural design and urbanized models over the past years of many branches of ITS have been introduced here to make a comparison analysis of Nagpur city Intelligent Transportation System. It will help in the awareness which can be studied further. The paper things to see the conclusions brought up from the studies of transportation systems and also give the future possibility in the road transportation to make it more users friendly and available.

***Keywords*:-** *Intelligent Transportation System Communication Technologies, Management Strategies & Traffic Troubles.*

I. INTRODUCTION

Intelligent Transportation Systems (ITS) is a organized route to provide solution, or to minimize traffic problems. Intelligent Transportation Systems includes all modes of transportation -such as road, rail, air & sea and a various different components of each modes of transportation -communication, operational systems, infrastructure, vehicle. Many countries had developed techniques & plans, based on their socio-economic, cultural, geographic and environmental surroundings, to utilize all the different components into an compatible system. The ITS applications works through Traffic Management Centre (TMC) where data is composed, analyzed and united with other operational and control concepts to solve the complex transportation problems.

A)Intelligent Transportation Systems classification

The ITS categorization is mostly based on the application of the system to precise level like vehicle level, infrastructure level and cooperative level, where the sensors, information processors, communication system, roadside messages, GPS updates and automated traffic prioritization signals, etc, are the key facial appearance in these system. The most frequently used cataloging of ITS is based on the positioning of the system as specified below,

- *Advanced Traffic Management Systems (ATMS*)
- *Advanced Traveler Information Systems (ATIS)*
- *Advanced Vehicle Control Systems (AVCS)*
- *Commercial Vehicle Operations (CVO)*
- *Advanced Public Transportation Systems (APTS)*
- *vi)Advanced Rural Transportation Systems (ARTS)*

II. LITERATURE REVIEW

Zhenlin et al. (2012) studied the productivity of the Beijing Intelligent Traffic Management System (ITMS). In this examination urban transportation frameworks, financial framework and vitality condition framework were taken as the info framework and the street traffic the executives proficiency and urban transport putting markers as the yield framework. The field information of Beijing from 2000 to 2010 are utilized for experimental investigation. The consequences of the examination demonstrated that the ITS enhanced the general proficiency of the Beijing transportation.

Purushothaman et al. (2011) proposed a comparative GIS based Emergency Response Management System for Mysore City, India. The created framework gives the system based spatial investigation, for example, network, discovering ways, portion, finding the neighboring office, characterizing administration territories, dynamic division.

Ganeshkumar and Ramesh (2010) designed Crisis Response Management and Information System (ERMIS) for Madurai city, Tamil Nadu. In this examination a point by point GIS database of transportation organize, mishap areas, healing facilities, emergency vehicle areas, police and fire stations was readied and spatial investigation was likewise done for mishap records of years 2004– 2008. Course discoverer was intended to discover most brief, efficient courses and administration territories.

Kumar et al. (2005) developed a GIS based propelled explorer data framework for the Hyderabad city, India under Arc View GIS condition. GIS-empowered modules for the most brief way, nearest office, and city transport courses were fused in the framework. The created framework gives data about key offices in Hyderabad City.

Faghri and Hamad (2002) studied the utilization of GPS in rush hour gridlock the board. In their examination use of GPS was ensnared in gathering traffic information, for example, travel time, speed and postponement on 64 noteworthy streets in the territory of Delaware. Whenever mean and fluctuation of the outcomes acquired by both the strategies were looked at and no huge contrast was watched. GPS information was observed to be half increasingly productive as far as labor.

Hernandez et al. (2002) incorporated the utilization of man-made consciousness methods in rush hour gridlock the board and gave a multiagent design for insightful traffic the board frameworks. Two multi-specialist learning based frameworks, InTRYS and TRYSA2 were produced to perform choice help for constant traffic the board. The execution of both the frameworks was assessed and general appropriateness of multi-specialist models for shrewd traffic the board was given.

Thapar (2001) presented a GIS based crisis reaction the board framework for Hyderabad city which can give the valuable data with respect to various offices and ideal courses amid crisis circumstances. In this examination the likely hazard zones were resolved dependent on the land use, building exercises according to National Building Code (NBC) rules. Productivity and adequacy of the fire benefit was contemplated and dependent on this an Emergency Response Management System was created.

Logi and Ritchie (2001) described a continuous Knowledge Based System (KBS) for choice help in the collection of coordinated traffic control designs resulting to the event of non-repeating blockage. In this examination, two calculations were produced i.e. information combination calculation for the examination of blockage and a calculation for the determination of control designs. The substantiation results demonstrated that by the utilization of Traffic Congestion Management (TCM) travel time diminished somewhere in the range of 1.9% and 29.0% and commonplace stop speed decreased somewhere in the range of 14.8% and 55.9%.

III. COMPONENTS OF INTELLIGENT TRANSPORT SYSTEM

A Traffic Management Center (TMC) is the vehicle organization office, where information is gathered, investigated and joined with other operational and control ideas to deal with the mind boggling transportation arrange. It is the inside for imparting transportation-related data to the media and the general population, a place where organizations can arrange and acquaint their reactions with transportation circumstances and conditions. Normally, there are a few offices which shares the organization of transport foundation, through a system of traffic the executives focuses.

A. ITS: Key Drivers and Tools

- Information technology
- Communications technology
- Mobile Apps
- Cloud computing
- Sensors
- Cameras
- GPS
- Digital radio
- RFID (Radio Frequency Identification)

Software needed for different applications. Indian firms among the global leaders in development of Information and communication technology

B. Potential of ITS in Transport

- Inter and intra vehicle systems
- Traffic management systems
- Transport coordination and multimodal integration
- Travelers and user information

C. ITS Applications

ITS applications is for traffic management, following are the ITS applications as per the Indian Traffic -

- Intersection control
- Incident detection
- Vehicle classification
- Monitoring
- Revenue collection
- Historical traffic data

IV. INTELLIGENT TRANSPORTATION SYSTEM AROUND THE WORLD

Improvements in intelligent transportation system is developing effectively by financial wants, and ecological requests. An report titled "Smart Transportation Systems: a worldwide Strategic Business Report", printed by world exchange Analysts, Inc., gives a far reaching audit of patterns, item improvements, mergers, acquisitions and distinctive key exchange exercises inside the space of ITS. in accordance with this report, the world commercial center for clever transportation frameworks (ITS) is anticipated to prevail in North American nation $18.5 billion by 2015. The us of America has the greatest territorial commercial center for ITS, representing an offer of for all intents and purposes four-hundredth of world income created.

ITS-America	Telephonic Data Dissemination, Congestion Initiative, IntelliDriveSM, Clarus Initiative , Cooperative Intersection Collision Avoidance Systems, Integrated Corridor Management Systems, Next Generation 9-1-1, Emergency Transportation Operations, and Mobility Services
ITS-Japan	Vehicle based navigation system, Gas rate whirligig as a heading sensor, Toyota Electro Crown model, Cathode Ray Tube to display the map. **First phase:** Use of electronic toll collection and in-vehicle navigation systems. **Second phase (2005):** Included rescue activities and rapid emergency, Establishment of public transport organizations, Information services Improvement to improve the transportation convenience. **Third phase (2005-2010):** involves in-vehicle equipment and infrastructure improvement. **Fourth Phase (after 2010)**: Telecommunications society and advanced information and, Extensive optic fiber network, traffic information gathered, The Universal Traffic Management System (UTMS) & Two-way infrared method.
ITS-Europe	Road Transport Informatics (RTI), Road Infrastructures is for the Vehicle safety in Europe (DRIVE), Program for European Traffic with Higher Efficiency and unexpected & new Safety (PROMETHEUS). Invent, and Prevent method., AGILE project developed a global navigation satellite service, Improve cross-border traffic and transport, The NextMAP project assessed accuracy and additional information & Advanced Driver Assistance Systems (ADAS) and such various applications.
ITS-Nagpur (India)	Rapidly growing metropolis, Run city buses, Cement Roads with widening the roads, metro in Nagpur. For transportation system Bus, Rail, and metro, LRT, BRT with efficient speed, frequency, facilities, comfort, convenience, and reliability. Passenger Information System (PIS). Automatic Vehicle Location System (AVL), Security Camera Network System (SCN), Bus Driver Console (BDC), On Board Ticketing Machines, Central Control Centre, Online ticket booking, Applications based vehicle booking.

Table 1:- Comparison in-between ITS-method of world

V. MAP OF STUDIED AREA

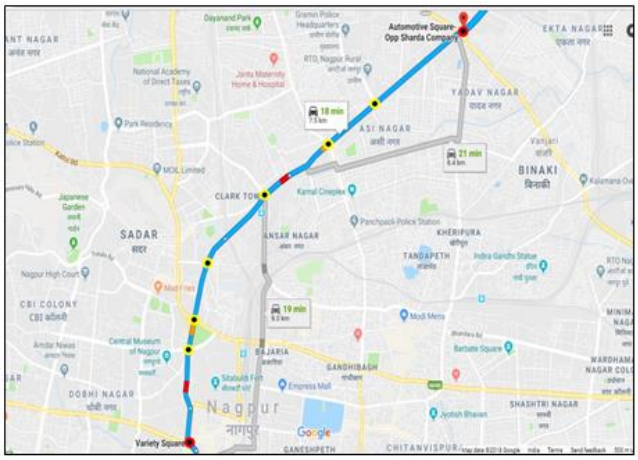

Fig 1:- Map of Kamptee Road to Buldi Nagpur

Vareity Square to Automotive Square
Distance - 7.5kms (Flexible Pavement)
No. of Signals - 7
No. of Lanes - 4

VI. RESULTS

- The fuel consumption per year is reduced by approximately 1.5 - 2% with implementation of ITS components.
- Automatic signal system is designed under ITS for Nagpur city area.
- By this project we save the enviornment from pollution through reducing CO and NOx emission**.**

Direction	Without Signal Syncronization	With Signal Syncronisation
Build To Kamptee	2107875 Lit	1861500 Lit
Kamptee To Buildi	2025750 Lit	1861500 Lit

Table 2:- Fuel Consumption in one year

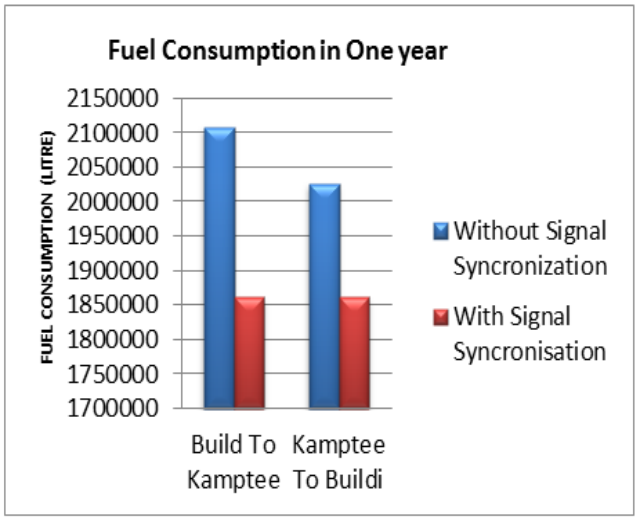

Fig 2:- Graphical representation As per Table 2

Gases	Without Signal Syncronization	With Signal Syncronisation
CO	210.7875	186.15
Nox	316.18	279.225

Table 3:- CO & NOx emission for one year (For Minimum emission Factor)

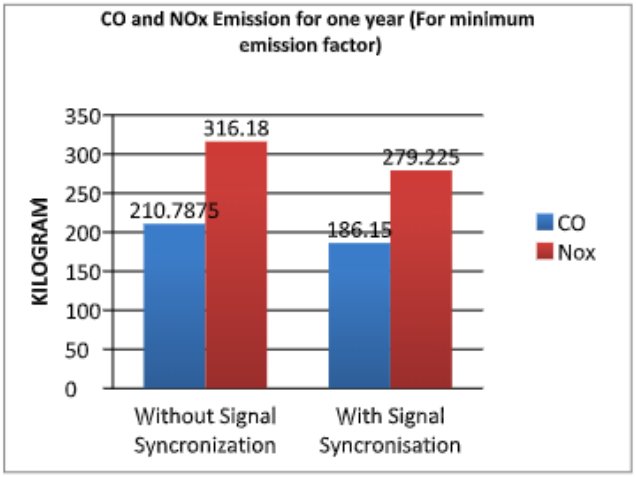

Fig 3:- Graphical representation As per Table 3

Gases	Without Signal Syncronization	With Signal Syncronisation
CO	632.3625	558.45
Nox	843.15	744.6

Table 4:- CO & NOx emission for one year (For Average emission Factor)

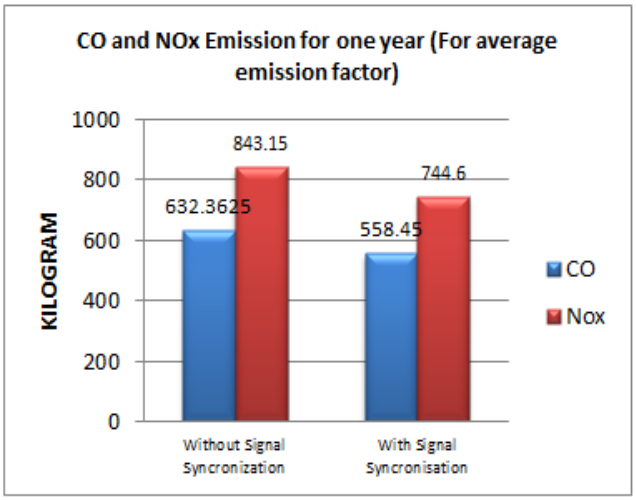

Fig 4:- Graphical representation As per Table 4

Gases	Without Signal Syncronization	With Signal Syncronisation
CO	1053.93	930.75
Nox	1370.19	1209.75

Table 5:- CO & NOx emission for one year (For Maximum emission Factor)

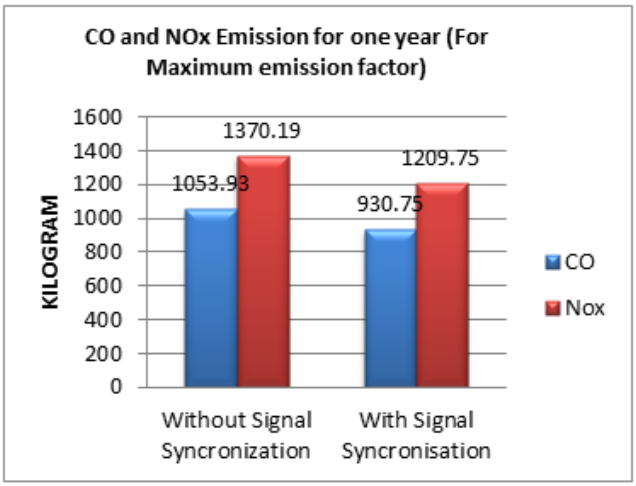

Fig 5:- Graphical representation As per Table 5

VII. CONCLUSIONS

Once implemented, it will bring Nagpur on the global map as one of the smartest cities of the world with best transport management. Recent expectations in relation to this potential have suggested.

- The fuel consumption per year is reduced by approximately 1.5 - 2% with implementation of ITS components.
- Automatic signal system is designed under ITS for Nagpur city area.
- By this project we save the enviornment from pollution through reducing CO and NOx emission.

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