International Journal of Enhanced Research in Science, Technology & Engineering
ISSN: 2319-7463, Vol. 5 Issue 6, June-2016

Study of impacts on traffic congestion

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ABSTRACT

Traffic congestion is one amongst main issues that's found in urban roads traffic and currently a days it's quite common with increasing road traffic, population etc. holdup is claimed to exist if the vehicles are movement below free flow speed, longer trip times and increased vehicle queneing and might cause even traffic jams if the free flow speed reaches to zero. The causes of traffic congestions are inadequate road capability, lack of pedestrian facilities, presence of heavy vehicles and lack of parking facilities near road etc. There are varied negative impacts of holdup in urban areas. the most important impacts of holdup includes accidents, pollution , pollution, health effects, stress on motorists, loss in economic process, delay movements, excess fuel consumption etc. attributable to these negative impacts of holdup everywhere the globe in urban areas have attracted several researchers and transport planner to seek out ways that to forestall traffic congestions. This paper specialize in study of impacts of holdup in on top of mentioned factors by considering main specialize in environmental factors. Awareness and data of those impacts among the folks is taken into account to be a good medium to forestall the folks and atmosphere from its sick effects.

1. INTRODUCTION

Traffic congestion or hold up could be a condition on road that happens as use the no of auto will increase, and has characteristics of slower speeds, longer trip times, and enlarged conveyance queuing. once traffic existing on road is nice enough that vehicle interaction slows the speed of the traffic stream, this leads to some congestion. As demand approaches the capability of a road (or of the intersections on the road), extreme hold up sets in. once vehicles ar totally packed for periods of your time, this is often referred to as a hold up or traffic snarls up.

Hold up happens once a volume of traffic or modal split demands for extra space than the obtainable road capability; this time is often termed saturation capacity. There ar variety of specific circumstances that cause or will increase congestion; Most of them cut back the capability of a road at a given purpose or over a particular length, or increase the amount of vehicles needed for a given volume of individuals or merchandise. Qualitative classification of traffic is commonly worn out the shape of a six letter A to F level of service (LOS) scale outlined within the road capability Manual (HCM). LOS A represents best riding conditions on road with attainment of free flow speed for vehicles and LOS F represents worst riding quality. HCM recommends a minimum of LOS B to be provided for national highways. These levels ar employed by transportation engineers as shorthand and to explain traffic levels to the lay public. whereas this method typically uses delay because the basis for its measurements, the actual measurements and applied math strategies vary counting on the ability being delineated . for example, whereas the percent time spent following a Slower moving vehicle figures into the LOS for a rural 2 lane road, the LOS at associate degree urban intersection incorporates such measurements because the range of drivers forced to attend through over one signal cycle.

Hold up contains a range of negative effects: holdup of motorists and passengers and it's unproductive activity for many individuals, congestion reduces regional economic health, delays which ends into late arrival at business places et al personal losses, wasted fuel increasing pollution and CO2 emissions, engorged vehicles a lot of frequents blow horn resulting in noise pollutions, wear and tear on vehicles as a results of frequent acceleration and braking resulting in a lot of frequent repairs and replacements, stressed and annoyed motorists encouraging violence and reduced health of motorists, higher probability of accidents as a result of tight spacing and constant stopping and going of vehicles.

International Commission on the Biological Effects of Noise (ICBEN) has counseled tips for investigation the community response, noise survey, and its effects on community. This includes the general survey style, social survey samples, social survey information assortment, and nominal physical science conditions (Fields, J.M., Jong, R.G., Gjestland T., Flindell, I.H., Job, R.F., Kurra, S., et al.)

2. IMPACTS OF TRAFFIC CONGESTIONS

The impacts refer to impacts of traffic congestions on environmental and other factors which are direct effects. The impacts primarily refers to impacts on lives, health, ecosystem, society, infrastructures etc. some of the impacts are given below

A. Effect on noise pollution

Traffic noise has become a significant downside today due to inadequate urban planning of town within the past.. the matter has been combined by increases in traffic volumes (two wheelers, serious motorcars, and different vehicles) so much on the far side the expectations of our early urban planners. From the survey and findings it's evident that road traffic noise affects human work potency at Government Offices, non-public Organizations, and industrial Business Centers beside the busy main roads (Pal, D., Bhattacharya, D., 2012)

By means that of form it absolutely was found that among all noise generating sources, road traffic was the key supply of noise followed by factory/machines. A health survey according concerning fifty two of population was suffering by frequent irritation. forty sixth respondent felt high blood pressure, and 48.6% determined loss of sleep as a result of sound pollution. because the noise levels will increase the extent of annoyance conjointly will increase (Aggarwal, S., Swami, B.L., 2011) future noise connected health hazards will cause permanent hearing disorder among exposed people. moreover, exposure of high level noise will cause severe stress on modality and systema nervosum of masses. (Zannin et al., 2006)

B. Effect on air pollution

The transportation sector is a major source of greenhouse gas emissions (GHGs) in the United States. An estimated 30 percent of national GHGs are directly attributable to transportation—and in some regions the proportion is even higher. Transportation methods are the greatest contributing source of GHGs in the U.S., accounting for 47 percent of the net increase in total U.S. emissions since 1990. Slower moving traffic emits more pollution than when cars move at freeway speeds. The relationship between driving speed and pollution isn't perfectly linear. Study suggests that emissions start to go up when average freeway speed dips below 45 miles per hour (mph). They also start to go up dramatically as the average speed goes above 65 mph. So, the "golden zone" for fuel consumption and emissions from your vehicle may be somewhere between 45 and 65 mph.

Whenever congestion brings the average vehicle speed below 45 mph (for freeway scenario), there is a negative net impact on CO2 emissions. Vehicles spend more time on the road, which results in higher CO2 emissions. Therefore, in this scenario, reducing congestion will reduce CO2 emissions. If moderate congestion brings average speeds down from a free-flow speed of about 65mph to a slower speed of 45 to 50 mph, this moderate congestion can actually lower CO emissions. If relieving congestion increases average traffic speed to the free-flow level, CO2 emissions levels will go up. Extremely high speeds beyond 65 mph can cause adverse impact on CO2 emissions. If these excessive speeds can be controlled, there will not only be direct safety benefits but also indirect benefits of CO2 reduction.(Barth, M. et. al,2008)

C. Impacts on fuel consumptions

The presence of acceleration noise would be expected to increase the fuel consumption experiment shows the effect of different levels of acceleration noise on passenger car fuel consumption at different speeds. The model is based on the thesis that there is an increase in accelerations with increasing congestion (Greenwood, I.D.; Bennett, C.R.,1995) The more microscopic approach based on the instantaneous fuel consumption in terms of liters per km or per time unit as a function of velocity and acceleration of the corresponding vehicle as fuel consumption depends strongly on the velocity profile. (Thiemann, c.; Treiber, M.; Kesting, A., 2007) Fuel consumption, and therefore carbon dioxide emissions, increased by an average of 30% for the two vehicles when travelling in congested conditions compared to daytime traffic. Inbound peak-hour journey times increased by an average of 85% over daytime trips for the two routes. Small increases in traffic starting from free flow conditions are positive in terms of fuel economy, but the general trend is that congestion increases fuel consumption. (Garcia-Castro, A.; Monzon, A.,2014)

D. Impacts on accidents

Hourly accident rates and volume capacity (V/C) ratio follows Ushaped pattern and accidents involving injury and fatalities tend to decrease while the V/C ratio increases. (Zhou and Sisiopiku ,1997). Another study on freeways found that with an increase in the V/C ratio fatal and single vehicle crashes deceases and crash rates (all crashes) follow a Ushaped relationship with V/C ratio.(Lord et al., 2005)

Aarts et al. (2006) reviewed the literature on vehicle speed and road accident relationship and showed that road incidents increase significantly with an increase in speed on minor roads than on major roads.In order to relate the speed limit and fatal crash found that in Washington (USA) speed limit and fatal crash occurrence have positive relationship, the higher is the speed, more number of fatal accidents occurs (Ossaiander, Cummings,2002)

Dickerson et al. (1998) revealed significant differences in accident - traffic flow relationship by road class and geography. Their outcomes are based on all types of accidents regardless of severity level. The empirical evidence by comparing fatality rates throughout day and found that during peak hours the fatality rate is obviously lower than at other times in the day(Shefer and Rietveld ,1997)

E. Impacts on economic growth

Downie (2008) also opines that traffic congestion occurs when the volume of vehicular traffic is greater than the available road capacity, a point commonly referred to as saturation. He describes a number of specific circumstances which cause or aggravate congestion. Most of such circumstances are concerned with reduction in the capacity of road at a given point or over a certain length, or increase in the number of vehicles required for the movement of people and goods. Downie (2008) further argues that economic surge in various economies has resulted in a massive increase in the number of vehicles that overwhelms transport infrastructure, thus causing
congestion on roads in cities.

May and Marsden (2007), however argue that congestion impairs us from moving freely and that it disrupts business activities in cities and reduces productivity. Congestion affects speed and smooth traffic flow. This affects a wide range of activities, services, goods, markets opportunities in the cities which can best be delivered through transport mobility. The report continues that congestion also reduces productivity through increased inventory holding by manufacturers and retailers as a result of unreliable travel conditions within cities. congestion on roads in cities.

Lewis (2008) and Downie, (2008) further delineate that although the digital revolution enables twenty 21st Century industries to adopt just-in-time production, distribution and inventory management system, the challenges in the transportation system such as congestion, makes it difficult for them to be up to the task of ensuring reliable just-in-time deliveries for enhanced productivity and competitiveness

F. Impacts on health of living beings

Constant exposure to loud levels of noise can result in loss of hearing, occurrence of aggressive behavior, disturbance of sleep, constant stress, fatigue and hypertension, sleeping disorders(Babisch,2002), cardiovascular disease (Vienneau et.al, 2015) and stress related heart problems, effect on wildlife etc.

Annoyance, sleep disturbance and other health effects of road traffic noise exposure may be related to both level and number of noise events caused by traffic, not just to energy equivalent measures of exposure. Dynamic traffic noise prediction models that include instantaneous vehicle noise emissions can be used to estimate either of these measures (Coensel, B.D. et.al, 2015)

Children with acute leukemia had higher odds of exposure to traffic-related air pollution at birth compared to controls. The exposure to the fourth quartile of NO_2 (11.19–19.89 ppb) were stronger among children with acute myeloid leukemia (AML) than acute lymphoid leukemia, with a positive association observed among urban children with AML. (Janitz, E.A. et. Al, 2016) **g.Impacts on fuel consumptions**

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H. Impacts on delay movements

Due to traffic congestion on roads travel time to the distinction varies and travel Time Variability has several distinct components, including differences in travel time from day-to-day, over the course of the day, and even from vehicle-to-vehicle (Noland and Polak, 2002). Based on the findings of this study, it was concluded that traffic congestion affect freight movement in the following ways; increased travel times decreased in fuel efficiency, increasing cost of fleet operation, shrink in market coverage, higher cost of shipment and drivers stress. **(**Fadare, S.O., Ayantoyinbo, B.B,2010)

3. AWARENESS REGARDING ILL EFFECTS OF CONGESTION

If the real-world, stop-and-go velocity pattern of vehicles could somehow be smoothed out so an average speed could be maintained, significant CO2 emissions reductions could be achieved (Barth, M.; Boriboonsomsin, K.; 2008) While progress in vehicle efficiency improvements and carbon-neutral fuels are underway, innovative traffic operations improvements (i.e. mitigating congestion, reducing excessive speeds, and smoothing traffic flow) can have a significant impact on vehicle CO2 emissions.

To avoid the traffic congestion the steps can be enlarging the width of the road, construction of proper drainage, provision of parking space, rehabilitate all roads needing attention, public enlightenment/traffic education, hacking down all illegal buildings/shops built on the right of way (ROW), provision of road furniture, create a separate/alternative root for trucks and heavy vehicles, provision of pedestrian facilities, in-depth training of transport/traffic personnel, create special commercial transport coordinator and banning all form of road side trading/hawking are among the major remedies suggested from this study. (Popoola M.O., Abiola S. O., Adeniji, W. A.)

CONCLUSIONS

The effect of traffic congestion on the various factors is very serious and with increasing traffic at such fast rate the effects are further increasing and need to properly investigated and some awareness program also need to be held to tell the impacts of traffic congestion to the common people. The effects of traffic congestion on environment also need to give special attention as its effects the health of surrounding people and long term effect on ecosystem.

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