

## Situation of urban traffic in Vietnam

**Dinh Tuyen Nguyen, Cong Tri Tran**

*Ho Chi Minh city University of Transport, Ho Chi Minh city, Vietnam*

---

**Abstract:** Vietnam is not the largest motorcycle market in the world but it is considered as the country with the highest density of motorbikes moving in the inner city. Ho Chi Minh City is home to the highest rate of motorbikes in the country today with nearly 7.5 million units, followed by Hanoi with 5.3 million units. In urban areas in Europe and the US with the characteristics of large land, sparse people, harsh climate, spacious roads, and mechanized development, the density of cars is high and the density of residents in the inner city is low. In developed cities in Asia such as Singapore, Hong Kong and Taiwan, urban development is mainly concentrated around subway stations at 66% in Singapore, 78% in Taiwan and nearly 90 % in Hong Kong. Because it is mostly accessible by public transport, residents have a habit of living around stations. Traffic congestion is a "hot" issue of urban traffic, this situation occurs frequently at key intersections on main axes and gateways to the city, especially when a collision occurs. traffic or heavy rain during rush hours.

**Keywords:** Traffic jams, congestion, solution

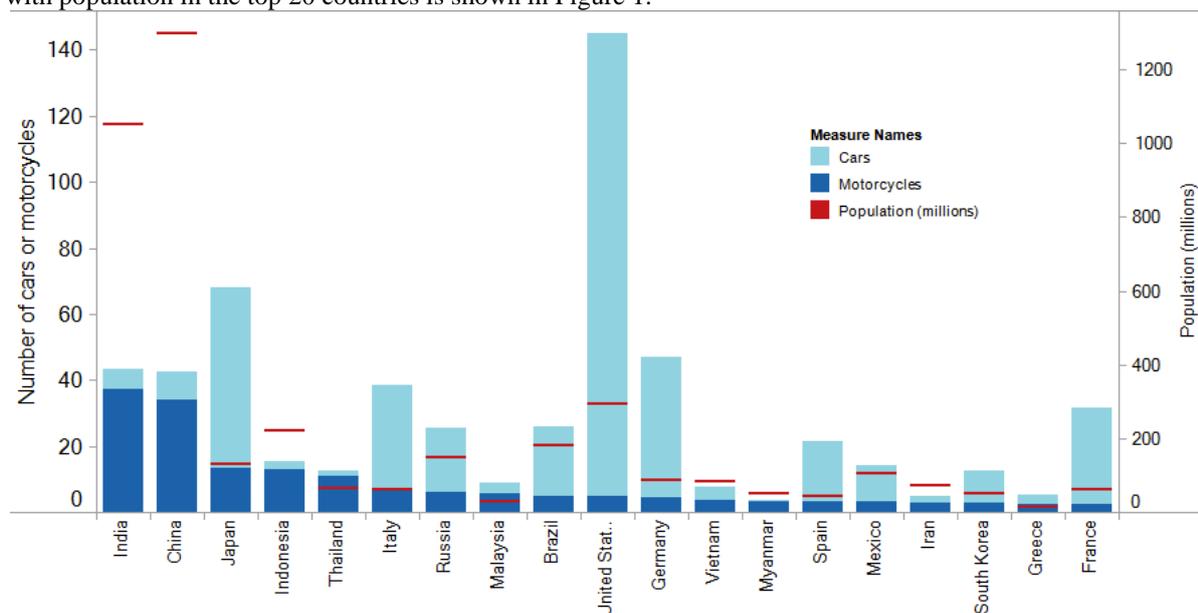
---

### Introduction

The Ministry of Construction also asked to study the stereoscopic intersection system at the intersections of Nga Tu Vong, Nga Tu So, Le Van Luong - Duong Lang; It should be noted that the current design of the Truong Chinh elevated route with an end point near the Nga Tu So area is not reasonable. 7 Kham Thien intersection should soon organize the implementation and widely examine technical and architectural options to solve frequent traffic congestion in the area. Co Linh intersection (Long Bien district) connecting to road 5B of Hanoi - Hai Phong - Quang Ninh expressway currently has an unreasonable distribution of routes, causing traffic accidents, conflicts with Ring Road 3, it is necessary to study options. connect Co Linh street with highway 5B under the overpass and reorganize intersections. In addition, it is necessary to focus on researching and proposing parking spots, parking lots (static traffic), underground car parks at public land locations (squares, gardens ...). At the same time, consider combining underground space to exploit services and trade. Attention when planning the parking place to note the parking spots on high (automatic parking). For the location of C9 underground station in Ho Guom, it is necessary to consider the location to achieve traffic efficiency, heritage conservation and public services. In order to solve the rapid increase of private vehicles in traffic, attention should be paid to the study of building a competitive transport market in the direction of multimodal transport, connecting transport among other forms of transport. together. The capacity of 1,800 buses on the 112 routes is currently overloaded, not meeting the travel needs. Therefore, it is necessary to diversify types of buses with different types of vehicles from 10 to 60 seats to fit the road section of Hanoi City. Develop a subsidy schedule for bus riders to change by the hour of the day, in order to create conditions for passengers to make the most of public transport, reduce the density of traffic in rush hour. Research policies to restrict personal transportation, especially historical inner-city areas. For Ho Chi Minh City area, Ho Chi Minh City urban traffic should be controlled by planning tools combined with scientific management organizations. Accordingly, the Ho Chi Minh City People's Committee should direct the elaboration of detailed plans, determine locations and boundaries to expand and build other traffic systems, relieve congestion, taking into account the Actual basis and scientific forecast. For the stereoscopic intersections, it is necessary to organize extensive examinations to ensure the objectivity, economy, technology, performance and architecture. This is a consequence of the main causes such as: Large traffic demand, high rate of personal vehicle use, fast urbanization rate, while urban transport infrastructure is insufficient and not yet available. completion, the quality of public passenger transport services is still low, the awareness of law enforcement of road users is not high, violations of transport infrastructure and traffic order and safety take place quite popularly. According to the World Bank (WB), Vietnam is one of the five countries most affected by sea level rise and is the second country in the world has been strongly influenced by the change climate. Urban planning in Vietnam is almost done by traditional methods. The planning product lacked flexibility, lack of multi-disciplinary coordination in the planning process, lack of plan implementation planning and resources to build in accordance with planning. Meanwhile, transportation infrastructure has been paid attention but still not enough to meet the demand, the rate of land for transportation is low; lack of parking stops, parking lots. In large cities, the urbanization process is going at a faster pace than the actual situation of investment in improving and developing the transport infrastructure system; motor vehicle emission control is complex and lack of consistency between related sectors. As a result, the fast-growing and uncontrollable personal mobility

(an average annual increase over 10%) is one of the main issues of traffic jams, particularly in the two cities such as Hanoi and Ho Chi Minh City [1]. In Vietnam, there are many types of vehicles on the same route as cars, agricultural vehicles, motorbikes, bullocks, carriages, bicycles, trains, pedestrians, and even animals. Ho Chi Minh City and Hanoi are the developing and economic cities in Vietnam. However, the strong process of urbanization, ever-increasing immigrant population, the non-synchronous infrastructure system, the incorrect orientation of urban planning, the weak management, poor awareness of traffic participants makes the traffic in Ho Chi Minh City and Hanoi worse. Traffic jams, noise, dust pollution caused by the traffic vehicles have become a dread of those who have come to these cities. Urban transport is like the blood vessels of the human body, and blocked blood vessels mean that the body dies. Traffic jam affects the economic development, time of people involved in traffic. In Vietnam, according to statistics, from 2008 to present nationwide occurred 1,379 traffic jams lasted over 1 hour, of which 336 cases occurred in Hanoi, accounting for 24.4%; 227 cases occurred in Ho Chi Minh City, accounting for 16.5%. According to a report by the National Traffic Safety Committee, the current number of vehicles is about 46 million motorcycles and 2.9 million cars. Currently, public transport in Hanoi only meets 7-10%, Ho Chi Minh City only meets 9.8% of demand, thus this is forcing more than 90% of the rest that have to travel by motorcycles and other personal transportation means. This article presents the status of traffic in two major cities of Vietnam such as Hanoi and Ho Chi Minh City, thus offering solutions to overcome traffic congestion in these two cities. The results of the article contribute to the reduction of traffic congestion in Vietnam.

In 2015, the average travel time to work in Hanoi and Ho Chi Minh City is 28-30 minutes corresponding to the average distance of about 6-8km, so far the average travel time to work has reached the threshold of 35-45 minutes corresponding to the average distance 8-10km, approaching the threshold of the major urban areas such as Malina and Jarkata is from 40 to 50 minutes, Tokyo and Osaka are from 30-40 minutes but the travel distance is not commensurate (due to current we are too dependent on individual means of transport) also means that the urban size is not adequate. The quantity of cars and motorcycles in comparison with population in the top 20 countries is shown in Figure 1.



**Fig. 1:**Cars and motorcycles in comparison with population in the top 20 countries

According to statistics, from 2008 to present nationwide occurred 1,379 traffic jams lasted over 1 hour, of which 336 occurred in Hanoi, accounting for 24.4%; Ho Chi Minh City has 227 cases, accounting for 16.5%. According to the Japan International Cooperation Agency (JICA), the economic losses due to the congestion in Vietnam's major cities such as Hanoi and Ho Chi Minh City can range from 2% to 3% of gross domestic product. Therefore, studying and proposing solutions for contributing to the reduction in the congestion in Vietnam's major cities is very necessary and urgent matter. Traffic congestion in Vietnam's major cities is the result of major causes such as high traffic demands, high rates of personal transportation, rapid urbanization. The urban transport infrastructure is lacking and incomplete, and the quality of public transport services is still low. This paper presents some solutions to overcome traffic jams and congestion in some big cities in Vietnam [1,3].

### Main Cause of Traffic Jams in Vietnam

According to the studies conducted, the average number of journeys per citizen in Vietnam's major cities ranged from 2.7 to 3.0 trips per day per person [7], especially during the holidays. According to the survey number in Ho Chi Minh City, to prepare for the holiday season on September 2, 2017, the Mien Dong Bus Station will increase by 1% and exporters will increase by 2%. At the Western Bus Station, the number of passengers traveling to the western provinces increased from 4% to 6%, of which, the peak was 54.000 to 56.000 passengers. It is expected that the holiday season in 2017, the number of visitors will increase by 30 to 50% compared to weekdays. It is forecasted that by 2020, the demand for traffic in Hanoi will be over 18 million trips per day. Ho Chi Minh City will over 30 million trips per day [5]. The uneven distribution of traffic demand leads to the overload of transportation infrastructure in these cities. At peak hours from 6h45 to 7h30, from 16h30 to 17h30, there is a large demand for traffic, which can increase to 200% -300%, causing local congestion at intersections. Figure 2 shows the traffic situation at rush (a) and off-rush hours (b) in Ho Chi Minh City at the Lang Cha Ca cross. Figure 3 shows the traffic situation at rush (a) and off-rush hours (b) in Hanoi in Nguyen Trai Road. According to statistics, the growth rate of cars in Vietnam is now 16%, while the speed of transport infrastructure development is 0.25%. According to the traffic management scheme for Hanoi streets in 2015, the total number of cars and motorbikes on the road is about 80% of the street area. With the above growth rate of cars, this number will be 100%. Experts have evaluated that the density of transport networks in big cities such as Ho Chi Minh City and Hanoi is only 8%, while the demand is 20-25%. By surveying some main traffic points at the gateway to Hanoi in July 2016 TDSI (Transportation Development and Strategy Institute), the proportion of car cars accounted for 14.38% of the number but accounted for 42.18% of the area Road surface occupancy of motorcycles is 43.62%, the rest are buses and other vehicles. Thus, individual vehicles (cars and motorbikes) occupy 85.8% of the surface area. Meanwhile, the urban road system is overloaded, not meeting the growth rate of individual vehicles. Experts estimate that if 60% of Hanoi's vehicles (50% registered in Hanoi, 10% of haunt traffic) in urban areas at 20km/h of speed would occupy 236%. If to develop naturally, the cities will seriously congestion with the area occupied by vehicles more than 3 times. By 2025, the road occupied area of individual vehicles will exceed the road capacity of 7.58 times, in 2030 more than 10.56 times, that means all traffic means cannot move. In general, the rate of motorized means of transport in Hanoi and Ho Chi Minh City is over 70%, higher than other cities in the world such as Paris (2008) 32%, New York (2010) 33%, Berlin (2010) 32%, Tokyo (2009) is 12%, Shanghai (2011) is 20% [7]. According to JICA study, with the increasing speed of private means, if not improving transport infrastructure and applying uniform solutions, by 2020, most of the roads in major cities of Vietnam are overloaded.

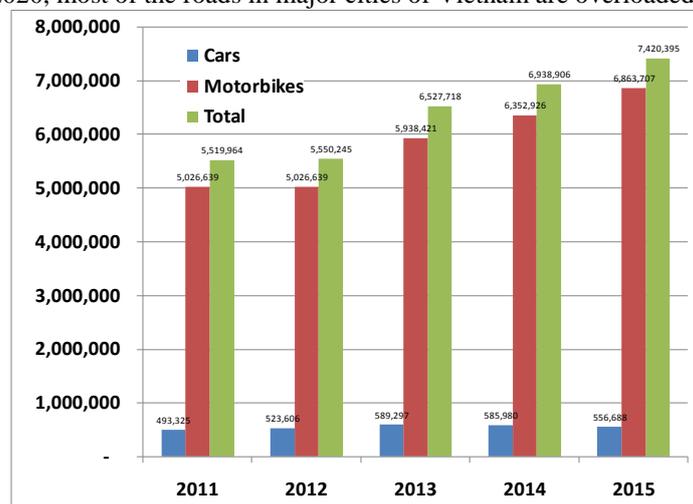
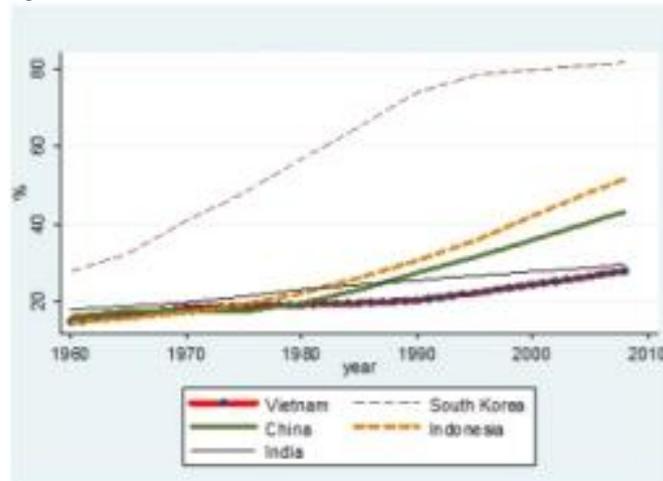


Fig. 2: The increase rate of private vehicles in Vietnam from 2011 to 2015

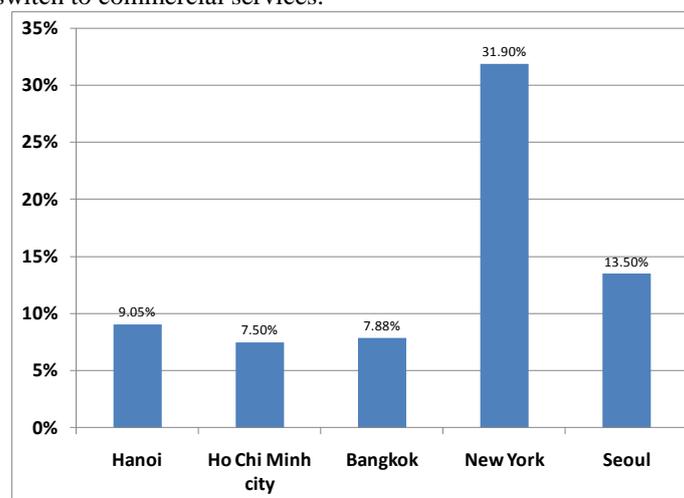
According to the World Bank, Vietnam is rapidly urbanizing, space and population in urban areas have increased rapidly. Vietnam is the seventh largest urban area in 2000 (2.200 km<sup>2</sup>) to the fifth place in 2010 (2.900 km<sup>2</sup>) in the urban hierarchy overtaking both Thailand and South Korea. In terms of space, Vietnam's urban areas grew by 2.8% year on year, among the fastest growing in the region. Vietnam is in the process of accelerating urbanization at the fastest rate in Southeast Asia (3.4% of increase per year). It is forecasted that by 2020, the urban population will reach 44 million (currently 32.3 million by 2016), accounting for 45% of the urban population in the country, 2025 in the urban population of 52 million, accounting for 50% urban population in the country. Although Vietnam's urban system is rapidly expanding in quantity, urban quality is low. In particular, the technical infrastructure and social infrastructure are not synchronized; the level and capacity of

urban management and development is low compared to the requirements; the pace of infrastructure construction in most urban areas in Vietnam is slow compared to socio-economic development. The overloaded urban infrastructure causes widespread traffic congestion, flooding and urban environmental sanitation, and these areas fall into the middle of a crowded residential area. Urban sprawl has led to the capture of agricultural land affecting national food security. Capacity for solid waste collection and treatment, especially hazardous solid waste has not been properly implemented. Characteristics of personal transportation habits, causing serious waste of natural resources, air pollution and noise. The rate of urbanization of Vietnam in comparison with some countries is presented in Figure 3.



**Fig. 3:** The urbanization rate in Vietnam

According to statistics, in urban areas, transportation infrastructure indicators only meet 35-40% of the demand, such as in Ha Noi, the land area of traffic is about 9.05%, road density reached 3.89km/km<sup>2</sup>; in HCMC. Ho Chi Minh City has a land area of about 7.5%, the road density is 3.88 km/km<sup>2</sup> (Figure 6). Major cities under the central government have implemented many projects on urban transport, such as upgrading, upgrading and building new external transport axes, cellular gateways, centripetal traffic axes, intersections level, different levels, ring roads, bypass, overpass in urban ... However, congestion and traffic accidents are still very common. Static traffic is always a problem for big cities. According to experts, land use planning for roads should include land for parking lots (at least 1% of urban land, 10% of central land); whereas now, the land for static traffic has not reached 1% (the world standard, countries generally have to be from 3 to 3.5%). Even in small towns, the percentage of land allocated to static traffic is much smaller than required. This is partly due to the fact that compensation costs are too high, so the land area for parking lots is not paid much attention. Some investors use the land for parking to switch to commercial services.



**Fig. 4:** Rate of land area for traffic in some cities

Although bus is now the main mode of passenger transport in Hanoi and Ho Chi Minh City. However, the quality of public bus transport services in big cities of Vietnam is still very low in comparison with other developed countries in the world and the rate of taking of this public passenger transport only meets about 10% of the travel demand of the people. Recently, the service of public transport in Hanoi has increased in quantity with improved quality, contributing to solving part of travel demand of people, reducing accidents, traffic jams, environmental pollution. However, only about 10 - 12% of travel demand is met. In terms of quality, on a scale of 5, the survey is based on six groups of factors including cost, accessibility, safety, reliability, facilities and staff, resulting in 3,52 points, reaching "pretty" level. According to a report, the results of public passenger transport by bus has not only achieved quantitative results (from resulting in 200.000 passengers per day in 2003, achieving an output of 1.000.000 passengers a day by the end of 2014) but also achieving quality gains, such as longer service times per day 14.45 hours/day. The time between the short the journey (7-10 minutes/trip, even have only 2-3 minutes at peak time) is providing a variety of services. Ticket prices (such as ticket fare - ticket fare - ticket - free fare, discount fare for students, students ...), diversified in type of line (non - subsidized route line, non - subsidized route, smooth, fast bus routes, students, students, workers). By 2014, the city has over 137 bus routes (of which 107 are subsidized and 30 non-subsidized), with about 2,800 vehicles in circulation. These achievements have contributed significantly to employment. To reduce traffic pollution, to reduce environmental pollution and to form an urban civilized lifestyle, especially in the use of public passenger transport means to travel, study, work and entertainment.

### **Solution for Overcoming the Traffic Jams in Vietnam**

Limited operation of motorcycles in some areas may be considered, by 2030, stop operation in the area of urban districts. The policy to restrict personal means of transport, especially motorbikes in large urban areas, such as Hanoi and Ho Chi Minh City, is right and necessary, stemming from practical requirements, meeting the demand development of society. This is also a classic solution to solve traffic congestion in most major cities in the world in terms of land fund, financial resources are not enough to meet the growth rate of individual vehicles. Statistics show that, by the end of 2016, in the city. Hanoi has 5 million motorcycles, 500.000 cars. With a growth rate of about 10% per annum, by 2025, Hanoi will have 11 million motorbikes and cars, while the transport infrastructure development is not commensurate. The most concrete evidence is that the proportion of land available for transportation in Hanoi is only 10% of urban construction land. By 2020, Hanoi also accounts for only 13% of urban land for traffic, far lower than the minimum level (20 - 26%) for the traffic system operated normally. In order to realize this vision, Hanoi and Ho Chi Minh city needs to mobilize hundreds of thousands of billion VND and ensure the progress of large infrastructure projects without "flood". At that time, the development of the new public transport system was not short of the roadmap for private cars.

At present, large intersections are equipped with steel overpasses to eliminate crossing, which in turn increases the efficiency of transport and avoids congestion. The effect of these overpasses only occurs at the intersection, even just reducing the congestion in the direction of the bridge and inverting the secondary push the congestion to the next node. Therefore, it is necessary to select and plan a number of points and implement continuous traffic flow solutions in some high-density locations and the main direction. The real solution is to add overload bridges or non-stop traffic planning on some major routes to reduce the overall traffic load in the area. However, due to the large number of overpasses along the route, the number, location, and size of each overpass should be carefully planned. The main direction can be arranged light steel bridge over all intersections or crossroads and take the right perpendicular to go round in the main direction and layout the turning point is approximately 20-50m from the intersection. Lightweight steel overpasses are not designed for trucks but are designed for cars and motorcycles as these two are the largest and therefore can reduce costs. Except for some large and important intersections, bridge designs for trucks, buses or even tunnels. Choosing the size of the overpass and the size of the tunnel can only require one lane in the narrow and small. The importance is the continuity of traffic flow with non-stop, non-intersection resulting in non-congestion. At intersections, the highly complex vehicle depended on motorcycles has caused considerable difficulty in separating the vehicle, the lane and the traffic, and the limited number of lanes, routes leading to narrow intersections, and consciousness, the driver's behavior of vehicles is not good, causing the congestion to increase. The survey at most intersections shows that the organization and control of traffic is not reasonable, the signal control program has not been optimized. For example, as the straight line and the opposite left are large, but are arranged in one control phase, they interfere with each other and increase the risk of congestion. The time division of the green light between phases is not appropriate according to the traffic flow from the routes to the intersection to the overload condition. In addition, bus stops within 30 m of intersections will reduce the viability of the intersection by 5-9% and the closer the intersection, the greater the impact. In particular, the bus condition is interrupted by other vehicles waiting in red light before the intersection, which makes it difficult for the bus to reach the stop position and exit the node during a signal light cycle. The above shows that cities need to upgrade the signal

control program at intersections. For traffic jams caused by illuminated traffic control programs, it is necessary to thoroughly investigate the traffic during the peak hours to upgrade the program accordingly. These solutions can contribute to eliminating the risk of traffic degradation by up to 15%, especially for large interchanges.

### Conclusions

In Vietnam, congestion in big cities like Hanoi and Ho Chi Minh City. Ho Chi Minh City is generally very alarming and complicated development. Traffic congestion in the two major cities, Hanoi and Ho Chi Minh City, is still complicated, points of danger of congestion tend to increase in densely populated areas. The main roads and access roads in the urban area have a great impact on urban transport, especially on the occasion of the Tet holidays, when major events take place. The process of economic development, industrialization and modernization is the premise for urbanization. The demand for transportation (traffic demand) always increases according to the process of socio-economic development. Demand for passenger transport mainly depends on the development of population, demand for transportation of goods depends on the economic development. Under current conditions, the demand for travel in urban Vietnam is solved mainly through road, so the process of expanding urban space is indispensable. The process of urbanization has attracted people from other provinces in large cities to work because of improved and diversified employment, study and living opportunities. Many functional economic zones, urban functional areas and the new urban areas are being built, which leads to the demand for transportation, the distance to travel, the demand for using high-quality means of transport, and the expansion of urban space. Invisible urban space, however, is partially limited by the travel time criterion. Right from the middle of the nineteenth century, the German urban researcher, C.Ritte mentioned the measurement of space to calculate the cost of time travel. British statistician F. Ganton has introduced contingencies to determine central access over time and thus speed is one of the key conditions for urban development. In the Soviet Union, the end of the nineteenth century travel time was accepted at 25-30 minutes, until the end of the twentieth century this number was accepted at 35-40 minutes, however traveled distance increase about 2 times.

### References

- [1]. Japan International Cooperation Agency (JICA)., et al. 2004. The Study on Urban transport master plan and Feasibility study in Ho Chi Minh Metropolitan area (HOUTRANS).
- [2]. Alain, B.,2011. Hanoi Urban Structure: Spatial Development Issues and Potential.
- [3]. Nguyen.V.N. 2013. Bus Prioritisation in Motorcycle Dependent Cities, Darmstadt, Germany.
- [4]. Transportation Research Board. 2010. Highway Capacity Manual, Washington, D.C.
- [5]. Land Transport Authority. 2011. Passenger Transport Mode Shares in World Cities,Singapore.
- [6]. Hsu. T.P., Nguyen. X. D., Sadullah, A.F.M. 2003. A Comparative Study on Motorcycle Traffic Development of Taiwan, Malaysia and Vietnam, Journal of the Eastern Asia Society for Transportation Studies, 5, 179-193.
- [7]. Khuat .V. H. 2006.Traffic Management in Motorcycle Dependent Cities, Darmstadt, Germany.
- [8]. <http://ashui.com/mag/tuongtac/phanbien/6585-do-thi-hoa-o-viet-nam-dung-truoc-nga-ba-duong.html>
- [9]. <http://www.tapchigiaothong.vn/giai-phap-nang-cao-chat-luong-dich-vu-van-tai-hkcc-bang-xe-buyt-tai-ha-noi-d11124.html>