

# **Traffic congestion in Ho Chi Minh city under the view of young civil engineer**

Bach Khoa University    Bao Hoang Mai

**Abstract:** This paper provides an overview about the scenario of traffic jams in Ho Chi Minh city. Also, the author indicates the main roots and reveal some under process projects of the government. Lastly but most importantly, this paper presents some promising strategies and solutions on 2 main aspects: technology and management.

## **I. INTRODUCTION**

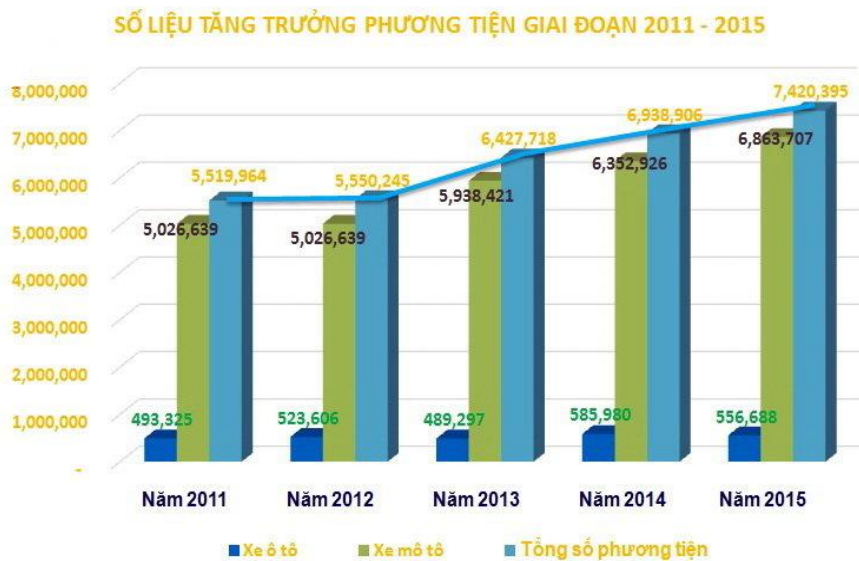
Traffic jams have been a huge problem in Ho Chi Minh recent years. It happens daily trapping hundred thousand of vehicles, wasting time and billions of money, causing problems in all aspects of the society. Lots of solutions have been done, but these short-term answers could not prevent traffic congestion worsening traffic in the city.



Figure 1 Daily traffic jams at rush hours

## II. TRAFFIC CONGESTION CAUSES

Under the view of a young civil engineer, author believes that there are 2 main roots: the huge number of vehicles and th



e infrastructures.

### II.1. Vehicles

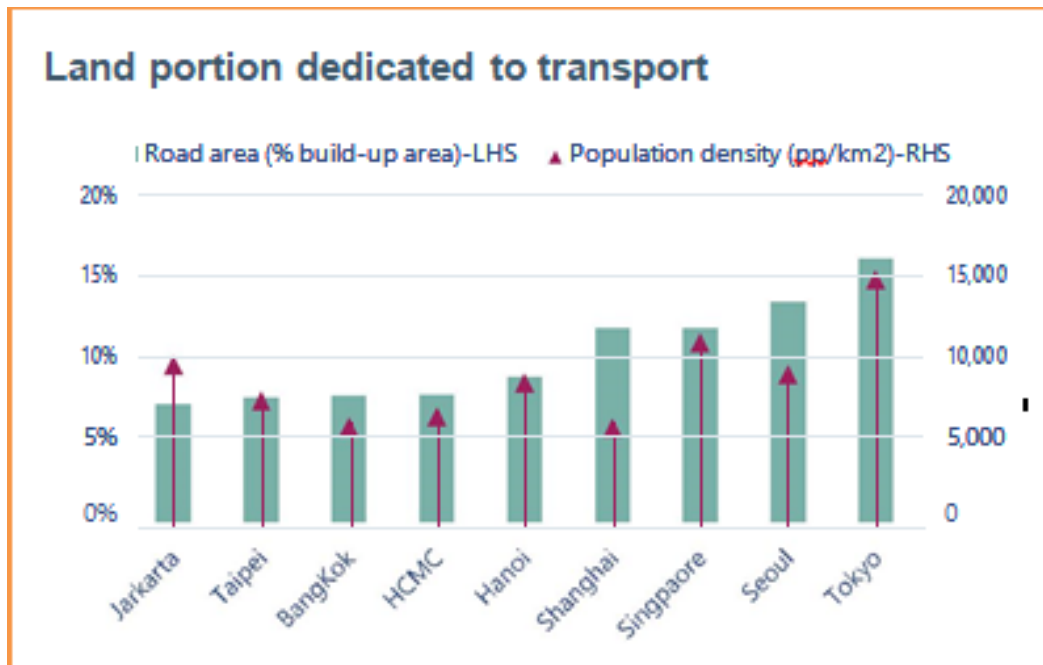
The Ho Chi Minh City has the largest number of motorbikes in the world, stand at over 7 million, which means 910 motorbikes per 1000 people – the world largest ratio (Compare to nearby cities: Bangkok (265), Jakarta (160), Dehly (175)). Also, it has approximately 700.000 cars, 3.250 buses and 100.000 taxis. At rush hours, at least 70% of the vehicles are on the road, hence making huge traffic jams with 37 hotspots throughout the city.

**Table 1** Number of vehicles during 2011-2015 (dark blue is cars, green is motorbikes and light blue is the total vehicles)

## II.2. Infrastructural systems

Although 750 motorbikes and 150 cars are newly registered everyday, but the traffic infrastructural growth rate is only 0.08% per year. Total length of the road system is 4155km, which is only 2km/km<sup>2</sup> (compare to 4-6 at nearby countries), the ratio of the area used for traffic is extremely low, at 8.5% (compared to 22.4% in developed countries).

Table 2 Land portion in some Asia cities



Source: Huynh & Jose, 2016; Demographia, 2016

## III. VIETNAMESE GOVERNMENT STRATEGIES:

Short term solutions like building more roads, overpasses are necessary, but only work in a finite amount of time. The HCMC Metro project is the long term solution since first planned in 2002 and started in 2012. In 2015, mass-rapid transit (MRT) network was set to work by PADDI. Beginning with a three-line MRT, the system has since expected to expand to an eight-line network, completed with supporting 6-line bus rapid transit and 3 routes: 1 tramway, 2 monorail lines.

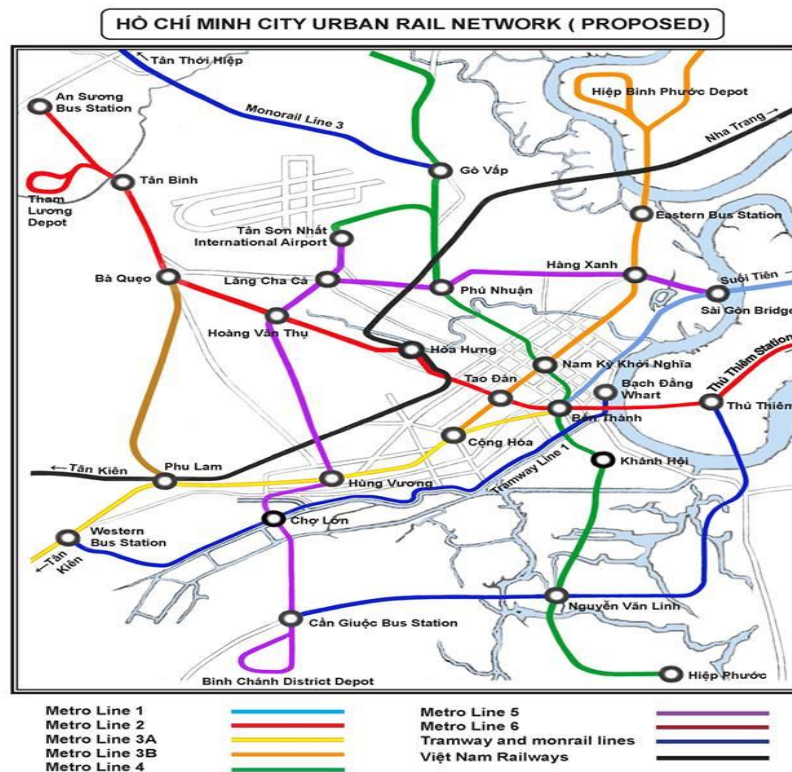


Figure 2 Ho Chi Minh city urban rail network

Now, Ho Chi Minh City has planned 5 elevated roads of nearly 71km and 6 metro lines of 106km, with the total investment of \$20 billion. The first metro line will start working by 2020 and expected to shift development focus. Being further from the city will become more appealing and shift the focus of investors away from the city core. In the figure

below, we can see the relationship between the MRT system and major traffic congestion points in the city.

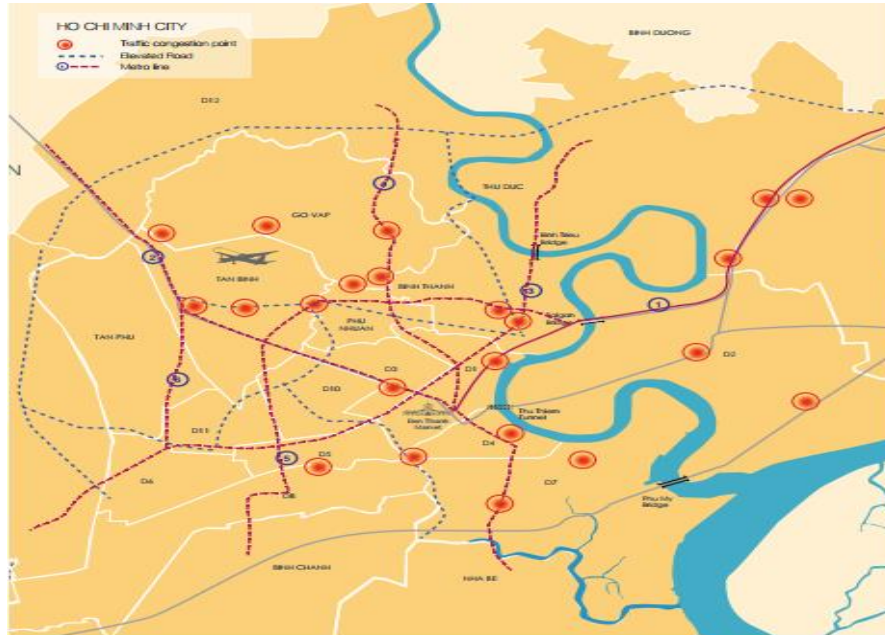


Figure 3 Traffic congestion spots and the MRT system





**Figure 4 Metro under construction on Ha Noi highway**

**BUS RAPID TRANSIT:** Ho Chi Minh city has also received a US\$124 million World Bank loan for the construction of a bus rapid transit (BRT) system, which is expected to become operational by 2018. The system will start with a single line running from An Lac in Binh Chanh District along Vo Van Kiet and Mai Chi Tho highways to District 2. Though it will eventually expand to a six-line system, the initial route will feature 28 stations over 23 kilometers as well as 17 pedestrian overpasses, eight parking lots, sidewalks and public parks, reports REIC. Once completed, the BRT aims to serve 28,300 passengers a day. However, this is just the first step of BRT. According to Dr. Pham Xuan Mai, from the Bach Khoa University, in order for the BRT system to become fully effective in a metropolis like Ho Chi Minh City, there must be a network of at least 25 BRT lines that can carry up to 2.8 million passengers daily, equivalent to 17.5 percent of the city's travel demand.



**Figure 5 BRT model at Vo Van Kiet boulevard**

**MONORAILS AND TRAMWAY:** The tramway number 1 has 12.8km length. Next, the monorail number 2 has 27.2km length and it is connected with the 3A metro. Lastly, the monorail number 3 is approximately 16.5km long. This is a very promising project because it crosses some populated areas including district 2, district 7, Bình Thạnh, Bình Chánh. The project is currently under investment from the BOT (build – operate – transfer) capital and PPP (public – private partners) capital. Along with the system, 3 depots are planned with the total area of 13.9 ha.

## **IV. INNOVATIVE SOLUTIONS**

### **IV.1 Technology**

Since this is the decade of smartphones, anti-traffic jam mobile applications have been developed by Vietnamese government. Based on a live statistics of 300 traffic cameras all over the cities, This apps are able to suggest the temporary optimum route (avoid traffic jams) based on the calculated travel time to destination (not distance). Hence, main road will be

unloaded significantly at rush hours. As can be seen in the figure below, main roads are red color while the status color for nearby smaller streets are usually lighter. Thus, if citizens start using this app to choose the optimum route, the traffic volume could be distributed more effectively, hence unload the traffic congestion in main roads by lower the number of vehicles to subsidiary streets.

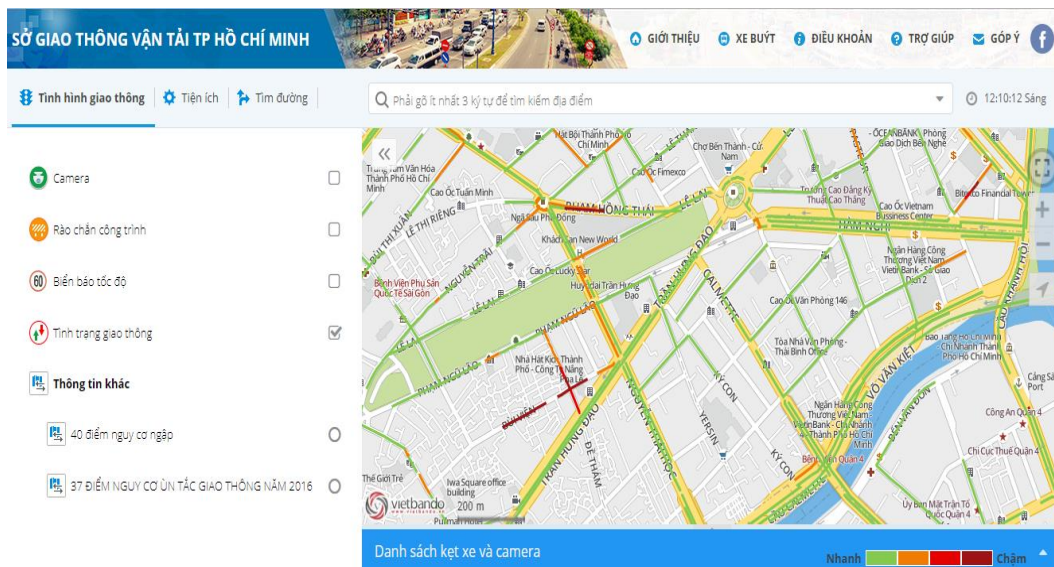


Figure 6 Live traffic on <http://giaothong.hochiminhcity.gov.vn/>

Moreover, applying advanced traffic control system (SOS) is another innovative solution. These systems can adjust the traffic phases, gap reduction through traffic lights and signals to optimum the road efficiency. In June, the 1<sup>st</sup> prize of OISP Bách Khoa scientific research contest belonged to the program called “Traffic light controlling stimulation”. The main purpose of this research is to analyse the application of SUMO (Simulation of Urban Mobility) in reducing traffic jams.



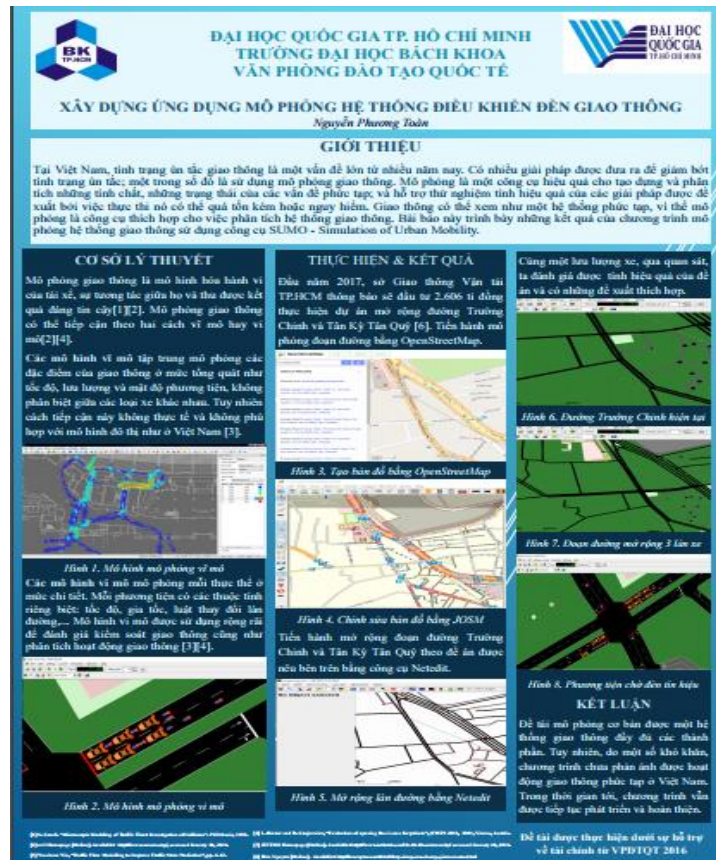


Figure 7 "Traffic light controlling stimulation" poster

The Bach Khoa University has developed a smart electrical motorbike system with some innovative improvement. In the future, this system may have an opportunity to become a modern public transportation. By building stations in the essential areas, it can reduce the number of vehicles on the road as well as emissions, traffic jams, fuel costs.

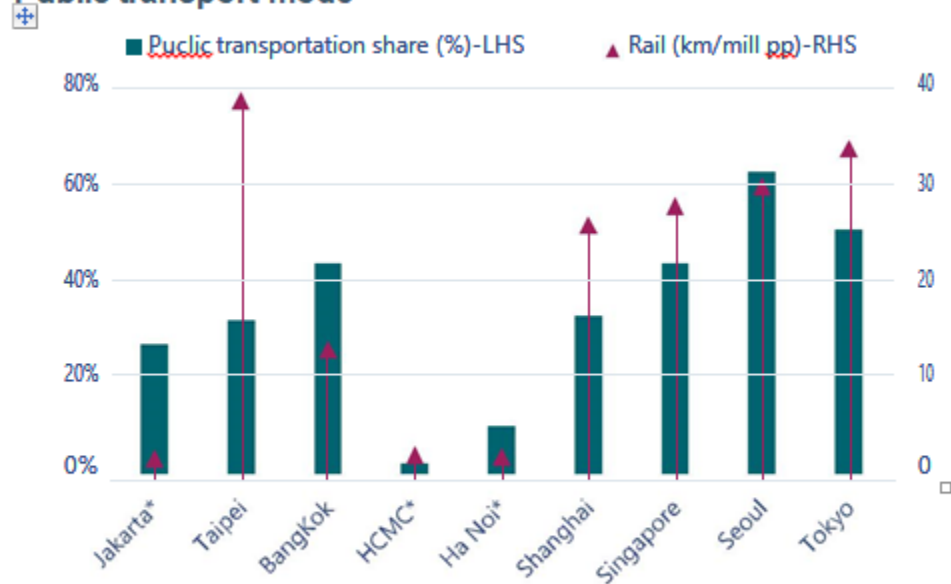


**Figure 8 Green electronic motorbike system of Bach Khoa University**

## **IV.2 Management**

Urban management methods like to expand the city, move the industrial zone into nearby area are still the priorities. Also, due to the fact that the metro only works effectively when the “satellite” structures are fulfill, the public infrastructure must be upgraded to increase the share of public transport.

## Public transport mode



Note: \* expected by 2020

Source: Ely, 2012; and adapted from various sources

**Table 3 Low share of public transport, motorcycles remain dominant mode**

Along with it, there are several management ideas which can reduce traffic congestion in a shorter term.

Remove unnecessary median strips on certain roads (currently apply by Thailand).

Build public parking spaces or parking lots (illegal parking on the road are one of the main problems for traffic, especially at rush hours).

Adjust the timeline of schools, works (primary, secondary and high school have the same breakout time, hence making huge traffic jams at 5pm-6pm).

## V. CONCLUSION

To summarize, the MRT system is the strongest answer to traffic jams by far. However, in order to maximize its efficiency, the MRT system needs to accompany with the smart urban managements, new technologies and the development of public transportation. At the end, with the applying of MRT systems, technologies and urban management, there are still plenty to complain in the short term, but also lots of promising scenarios to look forward to further down the road.

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