Transportation demand management: A solution to reduce congestion and towards a sustainable transportation in Hanoi city

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Abstract

Urbanization has grown fast within the past decade, especially in large cities like Hanoi, Ho Chi Minh city and Da Nang city. The number of vehicle has been rapidly increased recently, especially for the private cars. As a consequence, traffic congestion has become the horrendous problems to cause a low quality of life for people in big cities in terms of travelling time delay, economic lost, air pollution, culture degradation, disturbance social activities. To solve these problems, a transportation demand management (TDM) scheme addresses a variety of issues such as mitigation of traffic congestions, reduction of energy consumption and exhaust gas emission in the transport sector. The TDM measure does not require too much change on transport infrastructure, but it considers in promotion of modal shift, demand suppression, demand dispersal and efficient use of road space. In Hanoi, TDM measures have been introduced such as reduction on-street parking, restrictions on cyclos and staggered commuting. The paper presents an overview of TDM measures which have been applied worldwide, and to identify its possibility for applying in each specific local situations. Then, the paper discuss on the traffic situation in Hanoi, evaluate the current implementation of TDM measures in order to identify appropriate measures. The findings may help city agencies in better applying the right TDM solution at the right situations and thus result in reducing the traffic congestion towards a sustainable transportation in Hanoi as well in other similar cities in Vietnam and Asian countries.

Keywords: Hanoi, Transportation Demand Management, Sustainable Transportation

Introduction

TDM is a new concept that began to gain wide recognition in the later 1990s. It focuses on the suppression of the traffic demand and does not require too much change on transport infrastructure.

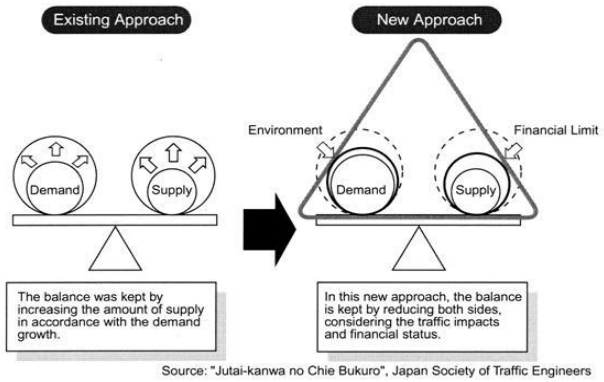

Fig. 1 Bike lane on street side of bus lane

The purpose of TDM is mitigation of traffic congestions, reduction of energy consumption and exhaust gas emission in the transport sector and so forth which involve changes in people's attitudes towards mobility.

TDM review

In the present study, TDM measures are classified in to four categories in term of the intended effects: (i) promotion of modal shift, (ii) suppression on demand, (iii) dispersal of demand and (iv) efficient utilization of available road space.

Solution "Promotion of Modal Shift" focuses on changing travelling method of transport participants through upgrading infrastructure for public transport, development of pedestrian and cycling facilities. The purpose of this solution is making more attraction for the new transport models, since then persuade passengers to change from private vehicles to new transport models. Infrastructure upgrade on public vehicles often concentrates on improvement of transit station, design the public transit routes form the suburbs to the central business district, and also building parking space near transit station to meet travelling demand of people to urban area by public transport.

Another method is development of pedestrian facilities such as sidewalks, crosswalks, universal designs, car-free malls. to create convenient environment for pedestrians and a safe, comfortable feeling for them also. Development of cycling facilities attract bicycle users by focus on developing on lanes and bicycle parking space.

Fig. 1 Bike lane on street side of bus lane (University Ave., Madison, Wisconsin, USA.)

This solution brings huge effectiveness: demand dispersal by many different forms of transportation, attracting passengers using public transport and non-polluting vehicles, thereby significantly reduce private means and vision to a sustainable transportation. However, these solutions are usually applied in middle-income or developed countries because these countries have convenient and consistent plan on traffic and construction, land reserve fund for traffic development, and financial capacity for those changes.

The second solution "Demand Suppression" focuses on travelling demand suppression of passengers by: increase on tax and private vehicle charge, congestion charge in peak hours (**Fig. 2**), higher parking charge in urban area, in addition, banning on lorries and encouraging tele-working measures. These solutions do not require infrastructure upgrade which does not cost too much. But, this needs to develop toll system and consensus from car users, logistic sector and public. Particularly, tele-working solution needs development of information technology infrastructure and an appropriate change of working method.

Fig. 2 Congestion charge zone

The third solution "Demand Dispersal" redistribute the demand in space or in time by concrete methods: congestion charge in region and hour by using Intelligent Traffic Information System (ITS) to transfer information to vehicles. This solution makes drivers drive on another route or run in another time to keep away from being tolled and congested. Another measure to redistribute traffic demand according time is to stagger commuting to offices and schools so that they can avoid a large amount of traffic demand accruing together at the same time. Meanwhile congestion charging and Intelligent Traffic Information System (ITS) require a developing and consistent information technology infrastructure, alternative work schedules need consensus form public and coordination between the management agencies and schools.

The last solution "Efficient use of road space". Solutions here are designing of Lanes or roads for High Occupancy Vehicles (HOV), developing form of car sharing and pooling, using traffic calming measures, and restriction on para-transit vehicles. Solution "Lanes for HOV" is usually applied in developed countries which have good infrastructure plan, law system on fining non-HOV running on HOV lane. Car sharing and pooling means the people who have the same destination will share their journey, however an organization or company will be in charge of gathering the same demands for their routes. Another solution is Traffic calming. It refers to various design features and strategies intended to reduce vehicle traffic speeds and volumes on a particular roadway.

TDM in Hanoi, Vietnam

Vietnam, a country in Southeast Asia, has seen a fast growth of economy in the latest decade. Hanoi city is one of the two biggest city of Vietnam trends upward also. The rapid urbanization leading to fast growth of private vehicles, up to now there are 3.7 million motorcycles in Hanoi accounting for 1/8 of motors, and 380.000 cars accounting for 1/6 of cars over the country. The number of newly registered vehicle is constantly increase each year, 12-13% of motorcycles and 9-13% cars[1].The amount of personal vehicles is creating great pressure on urban transport infrastructure and is one of the major cause of congestion.

Fig. 3 Hanoians are so acquainted with congestion in peak hours

Hanoians are so acquainted with congestion in peak hours. Long line of vehicles queuing and slowly moving on each centimetre. Traffic congestion not only increases the travel time, fuel consumption, emissions but also reduces economic growth and convenience when joining traffic and disturbs social activities.

Though the large amount of vehicles is not the main cause, in a long time of development Hanoi authority does not pay attention to planning transportation and construction while the travelling demand is growing up quickly. This is shown in inappropriate distribution of manufactures, schools, hospitals.. excessive land use in restricted developing areas for building commercial centres, apartments and offices.. In 2010, land for traffic is only 6.4% meanwhile the standard is 20%. Hanoi authority also delayed the implementation of public

[1] Source: Hanoi Department of Transport

transport which has large carrier such as Metropolitan Rapid Transit, Light Rapid Transit and Bus Rapid Transit. Up to 2015, there is no urban railway going into operation and from now on to that time, private motorcycles and cars are still main vehicles.

Facing with the increasing traffic demand, Hanoi authority takes TDM measures such as restrictions on cyclos, staggered commuting and reduction on-street parking to make traffic more smoothly, and reduces congestion.

Cyclos are rude vehicles used for carrying people and goods. Before that, Cyclos drivers do not need driving license and most of them show poor consciousness of traffic law, as the result, violation on working time and traffic law is often taken place. That endangers transport participants and obstructs traffic low. In 2009, Hanoi authority issued Decision to limit cyclos, only licensing for some tourist businesses.

Fig. 4 Much of foreign visitors to Hanoi order to visit Old Quarter on cyclos

After that Hanoi scene does not see cyclos overloading or carrying over-sized cargo that occupy too much space of street. Instead, they only see cyclos serving tourists. However, in a short time, those phenomena reappear : improperly park, occuppy space street, disorderly run.. which worsen the tourism image of Hanoi in the eyes of foreign tourists. In the middle of 2011, Hanoi traffic police's suggestion of banning cyclos from traveling on the capital city's streets has created a controversy among experts, travel firms and public opinions. According to travel firms, most of foreign visitors to Hanoi order to visit Old Quarter on cyclos. Experts and most of public opinion think that cyclos is a part of Hanoi culture which they can not leave. Until now, Hanoi authority does not make any decision on whether to eliminate cyclos in tourism sector or not.

Another measure Hanoi take to reduce traffic congestion is changing working and schooling schedule from the early days of 2012. This measure focuses on changing schooling schedule of students and working schedules of workiers in 12 districts of city to disperse traffic damand in times, to avoid gathering too much vehicles at the same time. Initial results are quite optimistic: the density of vehicles in peak hours at intersection decreases 5-15%, the average time of each journey reduces 10-15 minutes, public transport activities are more efficient. However, the efficiency of this method is not clearly, it just smooths congestion, not change traffic situation in Hanoi. For staggering the work and school hour, Hanoi seems to have little change on working hours of officers, they focus on changing schooling hour of students, meanwhile the biggest traffic volume mostly comes from officers not from students. Moreover, most of pupils in Hanoi have no means of transport or personal vehicles to schools, their parents still have to take them school and pick them up, so the change of schooling schedules have a big influence on daily life of Hanoian families.

Fig. 5 Parents pick up their kid at the shool gate

In the early 2012, Hanoi strictly prohibit parking in the sidewalks, roadway in 267 streets. A mass of parking permits are revoked, many vehicles improperly parking are fined seriously and aggressively. Following aggressive moves by management agency, roadways and sidewalks in

many streets have become clear, regain space for road users and pedestrians. But in a long time of development, Hanoi does not develop parking lots, They default that roadways and sidewalk are parking places, as a result, when many streets are prohibited from being parked leading to nowhere for car parking.

The next TDM solution for Hanoi

The next TDM solution for Hanoi will be conduct is Park & Ride pilot project. This project create convenient parking place for transport participants to keep their individual vehicles, then use city's public vehicles to go to city centre and versa, which can reduce individual vehicle volume in the city centre, help save the road space, reducing the fuel comsumption. But with the current conditions of Hanoi, Park & Ride project will encounter difficulties:

- The first difficulty is the habit of Hanoian in particular and of Vietnamese people in general. They shuttle children to school and buy food when they finish their work, and they can not do this when using public transport.
- The following is poor condition for pedestrian in Hanoi. They are suffering from humid and hot weather, dust and emission, daily acitivities of the households on the sidewalks, even there are no more sidewalks for pedestrian in many streets.
- Public transport infrastructures in the inner city is overwhelmed, it's difficult for them to undertake more demand now; moreover, bus journeys in urban area are also inconvenient, taxi rate is quite expensive and there is no form for public bike.
- The land withdrawal for parking lot have difficulties sometimes, it may take more money and time.
- This method is only suitable for those with fixed route, and less attractive to those who often have different journeys.
- The difficulty in changing perceptions and habits of people: give up private vehicles and switch to public transport.

For those above reasons, Hanoi should have detailed and accurate survey to determine the number of passengers using Park & Ride, and upgrade public transport infrastructure in inner city. The city should have activities to promote these kinds of public transport.

In transportation development planning of Hanoi city, authority determines that developing infrastructure is not a solution, the solution here is to develop public transport. And to do this, Hanoi still has a lot of work to do to reduce congestion in the inner city and move towards a sustainable transportation.

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