

Traffic Management Solutions – a case study on Singapore

With a land area of 697 square kilometers, Singapore is well-known for its small size. Out of this land area, 12% (nearly the same percentage as housing) is available as roads and support structure. In other words, for every square kilometer of land, Singapore has 4.7 kilometer of roads, making it the second densest road network in the world. Within such land constraints, it is usually difficult to accommodate a very high level of car ownership. However increasing aspirations of car ownership is an issue that cannot be easily ignored.

The keywords here to Singapore's answer to road and traffic management, are "optimum use of resources" and "achieving a balance". News from JAMA takes a look at a few examples of how Singapore adopts an integrated approach in using traffic management methods to keep the roads free-flowing amidst increasing vehicle population.

Traffic congestion is, at the very least, nuisances and inconveniences to motorists, affecting the quality of life. However it can also pose a serious threat by undermining productivity, the economy and the environment. Therefore the Land Transport Authority of Singapore (LTA), the government body overseeing the traffic and transport systems, constantly reviews the situation to achieve the most optimum.

Traditionally, expansion of infrastructure is by building more roads or widening the roads to

improve traffic flow. This method has its limits for the small city-state though. Any more widening of roads will require additional land to be taken up.

Utilization of Intelligent Transportation Systems

With the method of increasing road capacity more or less exhausted, Singapore looks into solutions with the help of technology such as Intelligent Transportation Systems (ITS). Such technology can monitor traffic conditions and share valuable information with other road-users real-time, allowing them to make better informed decisions while on the road.

The Expressway Monitoring and Advisory System

One example Singapore has utilized ITS is the use of the Expressway Monitoring and Advisory System (EMAS) on all expressways. Managed round the clock, the system uses surveillance cameras to monitor traffic conditions on expressways. When accidents or breakdowns happen, recovery teams can be alerted immediately. By responding within an average of 15 minutes, the interruption of regular traffic flow is shortened. Information on such incidents is also shared with other road users using the electronic signboard display.

Motorists can then make an informed decision to avoid the road where the incident



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occurred, thereby minimizing traffic congestion on the expressway, or to drive with more caution on approaching the particular affected stretch.

The Green Link Determining System

Traffic lights allocate the time of road-use to motorists and pedestrians. While enabling orderly and safe allocation, traffic lights could, unwittingly, become an obstacle to smoother traffic flow, when motorists have to stop at red lights even in the absence of pedestrians to cross the road.

Another system in use is the Green Link Determining System (GLIDE), which uses sensors to detect the amount of pedestrian and motorist traffic. By pushing the traffic light button, pedestrians send a signal to the system. There are also road sensors to detect the flow of traffic of vehicles, so that more green time is allocated for the motorists. In this way, the amount of “green time” is always regulated by the amount of traffic, such that the higher traffic volume gets more “green time”. In addition, the system is made more effective by linking the start times of the traffic lights at adjacent junctions, so what results is a smoother flow for motorists, without having to stop incessantly.

Electronic Road Pricing

Another important traffic management tool that aims to make optimum use of road usage is the Electronic Road Pricing (ERP). Based on a pay-as-you-use principle, the electronic system helps to minimize congestion by spreading out traffic volume.

By demarcating certain areas as being under ERP, motorists have to pay a fee upon entering the ERP area, with an electronic gadget installed in their vehicles to handle the automatic payment at the gantry point. The



location of the ERP area and the operational hours enforced are based on traffic conditions, with fees being

the highest at peak hours. This aims to deter those who choose not to pay for the usage of the roads.

For example, in the busy central business district, motorists would have to pay more during the early morning rush hour and the evening when people return home (see table). Those who choose to pay can enjoy a smoother journey on, for example, an expressway which is now at an optimum speed of 45 to 65 km/h. Conversely, those who do not want to pay are encouraged to decide whether to drive, when to drive and where to drive.

Thus when marginal users use alternative routes and schedules, the ERP roads are left to users with a higher necessity or who are willing to pay for the use, resulting in reduced users during the peak hours.

With a total of 48 ERP gantry points currently, the LTA reviews traffic conditions regularly to ensure that the system works. Seven years after its introduction, the stable rates have attested to its effectiveness.

Car-Sharing scheme

Car-ownership brings with it various conveniences. However, in land-scare Singapore, coping with rising volume of traffic is a challenge. In addition, the cost of car

Table
Current ERP rates for Passenger Cars on Weekdays for entry into the Central Business District: Monday to Friday 07:30 – 20:00

Operating hours	ERP rates (Singapore dollars)
07:30 – 08:00	\$0.00
08:00 – 08:05	\$1.00
08:05 – 08:30	\$2.00
08:30 – 09:00	\$2.50
09:00 – 09:25	\$2.00
09:25 – 09:30	\$1.50
09:30 – 09:55	\$1.00
09:55 – 10:00	\$0.50
10:00 – 12:00	\$0.00
12:00 – 12:30	\$0.50
12:30 – 17:30	\$1.00
17:30 – 18:00	\$1.50
18:00 – 18:25	\$2.00
18:25 – 18:30	\$1.50
18:30 – 18:55	\$1.00
18:55 – 19:00	\$0.50
19:00 – 20:00	\$0.00

Source: The Land Transport Authority, Singapore

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ownership in Singapore is supposedly the highest in the world.

Behind this scenario, a new way of car usage, the car-sharing system, was introduced in Singapore in the 1980s. Being a scheme that rents out cars, it thus encourages users to plan their trips more carefully. The system aims to make maximum use of resources and increase the efficiency of roads by providing use of a car only during times of need while at the same time, satisfying the need for the convenience of owning a car.

This system makes efficient and optimum use of a car because instead of being parked idle, different users at different times ensure that the use of the car is maximized.

Honda Diracc- a hybrid of convenience and environmental consciousness

Honda Intelligent Community Vehicle System (ICVS) Singapore, one of the four car-sharing companies in Singapore, provides an added benefit by helping to conserve the environment—its fleet of 50 Honda Civic are all hybrid cars, using an electric motor and a petrol engine, to achieve lower fuel consumption and lesser emission. It helps to create awareness for such ecologically friendly measures.

Under the service called Honda Diracc, its members enjoy extra convenience and flexibility as there is no pre-fixed time to return the car, and the user can access or return it to

any of the designated car parks. This means that there is greater efficiency in the vehicle usage and utilization of resources, ultimately helping to ease traffic congestion.

With 30% of its members using its hybrid cars as a second car, users are also encouraged to integrate and complement usage of Honda Diracc’s service with other forms of transportation.

As such, initiatives from the private sector such as car-sharing schemes contribute too in meeting the needs and addressing the issues of urban transportation in Singapore.

Traffic management is never an easy issue for any modern city. For Singapore, similarly, it is a continuous endeavor to strive for indigenous solutions. This is to ensure that when any of the 730,000 vehicles use the roads, the journey should be as comfortable and efficient as conditions allow, further maximizing the benefits of motorization.



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Driving in an ECO way — Ecologically friendly and economically sound —

Everyone has a part to play in protecting the environment of the earth. Motorists can do their part by driving in a more ecologically friendly manner.

By the same token, with the recent increases in petroleum prices, it makes sense from an economic standpoint to reduce fuel consumption, hopefully lessening the number of trips to the gas station.

The technology for “eco-driving” is built into vehicle design. But it is up to the motorist to adopt good driving habits to make use of these technologies.

Closely involved as it is with the automotive industry, JAMA supports environmental conservation through a variety of measures, including promotion of improved fuel efficiency. Here, News from JAMA shares some helpful tips for “eco-driving” with our readers. Following these will help you get started with smarter, more eco-friendly driving today!

Consolidate car usage.

As much as possible, combine your daily trips and errands, and cut down on unnecessary trips. You’ll find that you not only realize fuel economy but save time as well.



Hold down engine revolutions.

High revolutions consume more gasoline. On city streets, you seldom require more than 1,500 to 3,000 revolutions per minute. In cars with manual transmissions, shift gears before reaching a high rpm.



Avoid jack-rabbit starts. Smooth acceleration and braking will save fuel.

Plan maneuvers well in advance and make speed changes gradually.



Shift to neutral while idling in traffic.

If you’re not moving, idling in the neutral position reduces the load on the transmission and conserves fuel. For longer waits, simply turn off the ignition.



Keep tires properly inflated.

Under-inflated tires (or poor wheel alignment) mean more work for the engine, and burns more fuel. Misaligned wheels expedite tire wear.



Understand how windows and air conditioning affect fuel consumption.

Opening the window while cruising on the highway increases the car’s air drag, consuming more energy. In stop-and-go traffic, the air conditioning use boosts fuel consumption as well. Are you sure you really need it to be comfortable? If so, set to minimum levels during mornings and evenings, when outside temperatures are cooler.

Keep the car well maintained.

Keep the engine properly tuned and spark plugs clean, and the car will help to ensure better mileage.

Gas up when it’s cooler.

When temperatures are lower, the density of the gasoline becomes higher. When you fill up, leave space for expansion when the temperature is higher. This will help to avoid spills that add to your fuel bills.

Don’t carry greater loads in the car than necessary.

Gasoline is heavy too. Driving with the tank full adds to the car’s weight. Three-quarters of a tank full is usually plenty.

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