

## TRAFFIC MANAGEMENT SYSTEMS (TMS)

Traffic Management Systems (TMS) use a variety of technologies to manage traffic flows and the effects of congestion on the roading network. Traffic Management Systems do this by addressing the traffic management effects of accidents and slow moving or queuing vehicles, planned events and extreme weather. TMS include, ramp signaling, dynamic lane management, variable speed limits, incident detection, vehicle activated signs and adaptive traffic signal control.

Many of the systems are usually integrated to gain maximum benefit. Managing the allocation of road space is an important concept that is becoming increasingly relevant as it is not feasible or cost-effective to continue to accommodate the growth of urban traffic by constructing additional roads.

### Tools for Traffic Management Systems

Incident detection tools are designed to reduce the time taken in identifying and reacting to incidents on the network. If combined with other TMS and Traveler Information Services (TIS) it can improve network efficiency by minimizing congestion. It can also contribute to reduced response times for emergency vehicles and also minimise the chances of secondary accidents occurring.

#### Automatic Incident Detection

(AID) is usually implemented through the use of sensors or detectors and aims to detect traffic incidents along major roadways. Sensors are usually divided into two categories; intrusive (buried within the road) and non-intrusive (not buried within the road). Ramp signals are essentially traffic lights at motorway on-ramps that manage the flow of traffic onto the motorway during peak periods. When lights are red, vehicles stop and wait for the green signal. When lights turn green, two cars (one from each lane) are able to drive down the ramp to merge easily with motorway traffic. Ramp signals run on a quick cycle, only a few seconds between green lights.

Ramp signals do not have to operate all the time and can be switched on when necessary, especially during morning and afternoon peaks and other busy times. Ramp metering can be a cost effective tool in improving the throughput of a motorway and overall road network. It is most effective when applied system wide along a corridor that balances the needs of maximizing motorway throughput in addition to effective queue management.

#### Variable message signs

(VMS) can be used to alert drivers to traffic incidents ahead, congestion, events, parking availability and weather conditions.

There are three broad categories of information that can be displayed via VMSs:

- control (e.g. lane control, prescribing control)
- warning (e.g. weather conditions, incidents, congestion, road works, road closures)
- information (e.g. useful traffic/weather information, network messages, safety messages)

The benefits of providing real time travel information include:

- a reduction in driver frustration
- allowing drivers to choose to use alternative routes
- a reduction in congestion
- improved safety

### Variable Speed Limits

(VSL) and advisory speeds are designed to 'smooth traffic flow' by introducing a temporary speed limit based on traffic volumes and hence delay the start of

conditions. Other outcomes include enhanced safety and reduced vehicle emissions. VSL systems primarily aim to reduce incidents by managing the posted speed limits for congested or hazardous situations.

The benefits of variable speed signs is that they:

- improve journey times
- smooth traffic flow by minimising vehicles stopping and starting
- reduce accidents
- produce environmental benefits through fewer emissions

### Adaptive Traffic signal

Adaptive traffic signals can improve network efficiency by optimising signal timings and balancing traffic flows. This is achieved through automatic updating of cycle times that highlight changes in traffic distribution and volumes. Adaptive Traffic signal control enable traffic signal controlled

junctions to interact with each other. Such tools include Sydney Coordinated Adaptive Traffic System (SCATS). Adaptive traffic signal control systems seek to optimise traffic flow by considering traffic flow at multiple sites rather than a single junction's performance. This area wide approach can bring significant traffic management benefits including reduced congestion and faster more reliable journey times.