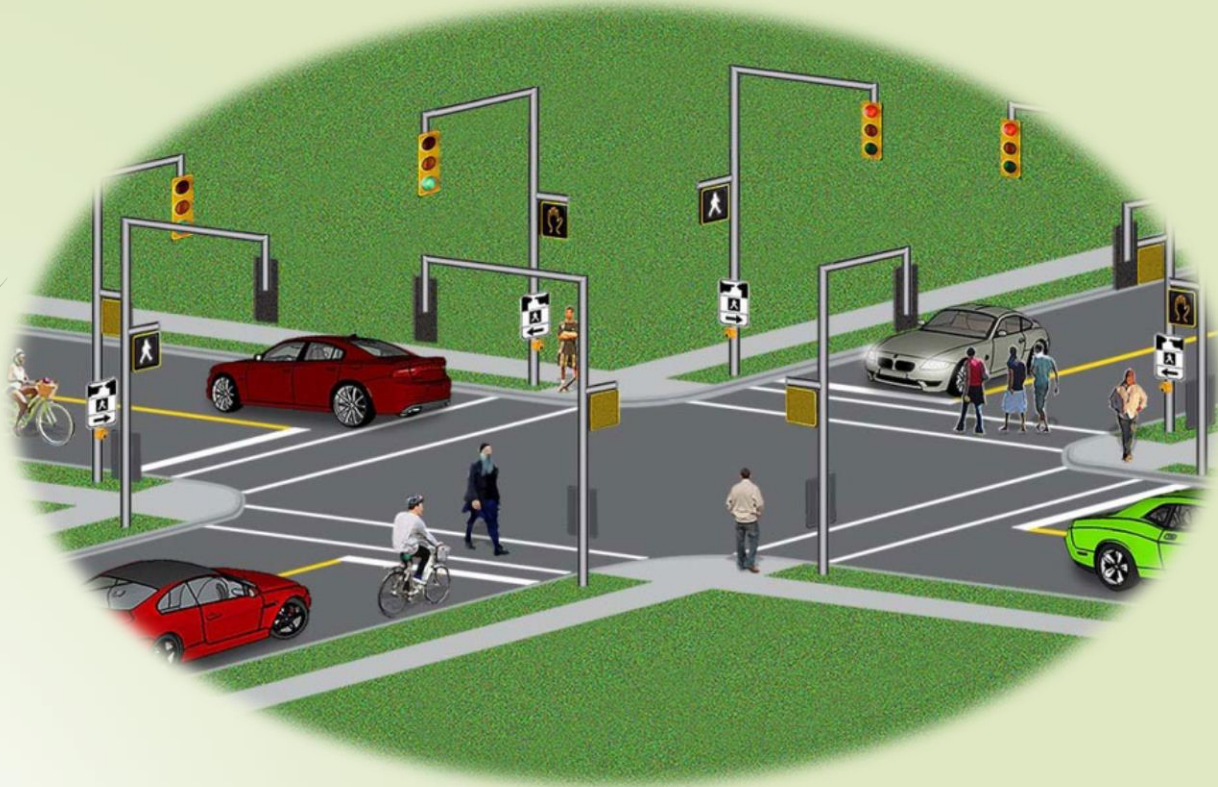


LEC 7



Traffic Signals Including Pedestrian Signals

TRAFFIC SIGNALS

Traffic signals are controlled devices which could alternatively **direct the traffic** to stop and proceed at intersection using red and green traffic light signals automatically.



Purpose of Traffic Signals

Traffic signals manage the right of way at signalized intersections to provide for the safe and efficient movement of vehicles and pedestrians. Traffic engineers and technicians develop and implement signal timing at each intersection to distribute green time amongst the competing traffic flows to provide for efficient operations.



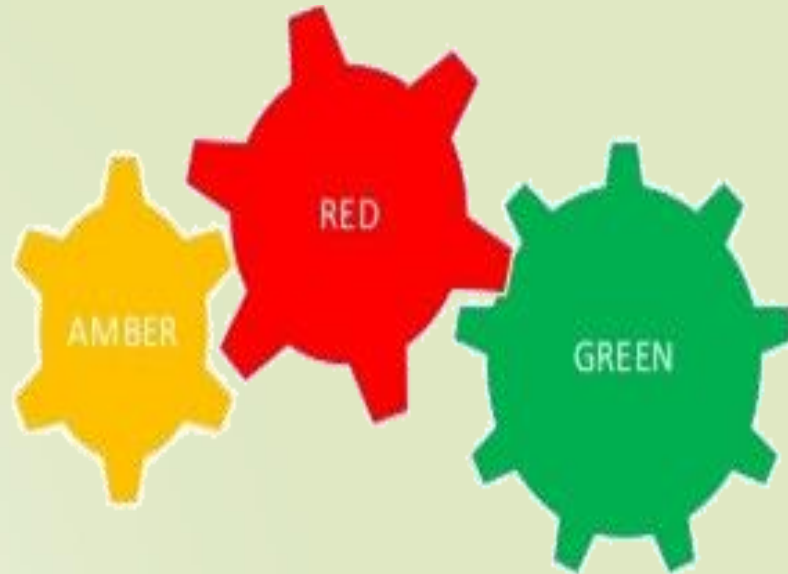
Need of Traffic Signal

- ❖ An opportunity for pedestrian or
- ❖ Vehicles to cross intersection
- ❖ Help to reduce the number of conflicts
- ❖ Reduce the frequency of accident
- ❖ Improve Safety



Signal Aspects

The indication given by a signal is known as the signal aspect.



Traffic Signal Advantages

- Ensures orderly movement of traffic in all directions.

- Provisions for the progressive flow of traffic in a signal-system corridor.

- Provisions for side-street vehicles to enter the traffic stream.

- Provisions for pedestrians to cross the street safely.

- Potential reduction of accidents, conflicts ensuring safety.

Traffic Signal Disadvantages

- Excessive delay;

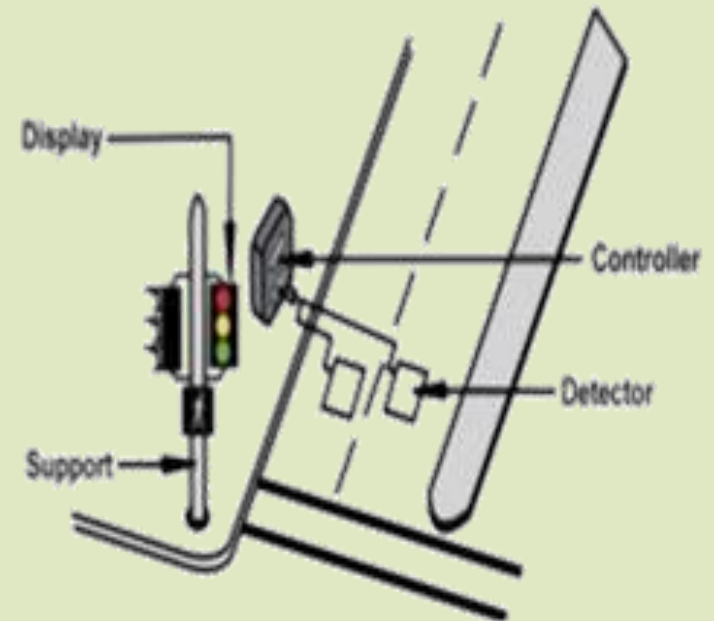
- Increased traffic congestion, air pollution and gasoline consumption;

- Disobedience of signals;

- Increased frequency of crashes, especially rear-end collisions.

Parts of Traffic Signal

Traffic Signals have four main parts:



Signal Controller

The traffic signal controller is the “brain” at an intersection that tells each signal display when to change colors. Years ago, traffic signals were controlled by a simple electric mechanism that made the display change every so many seconds, like a clock. These simple mechanisms were not able to adjust when traffic changed during the day.

Later in the pre-computer era, electromechanical controllers were developed that could be adjusted for the time of day. These controllers were much like the switch timers in the local hardware store that have green and red pins to set lights to go on and off on a predetermined schedule.

Signal Controller

Now, computerized traffic signal controllers get real-time information about the presence of vehicles from sensors in the roadway and on poles. Controllers adjust the amount of green time for different movements based on sensor information. The most sophisticated controllers and software programs allow for the coordination of signals along a roadway, so that vehicles can travel through a succession of intersections without having to stop.

Signal Controller



Count Down Timer ECE-CDT-MS-R-2.5



Count Down Timer ECE-CDT-MS-RG-2.5



Count Down Timer ECE-CDT-MS-R-2



Count Down Timer ECE-CDT-MS-RG-2



Fixed Time Traffic Signal Controller

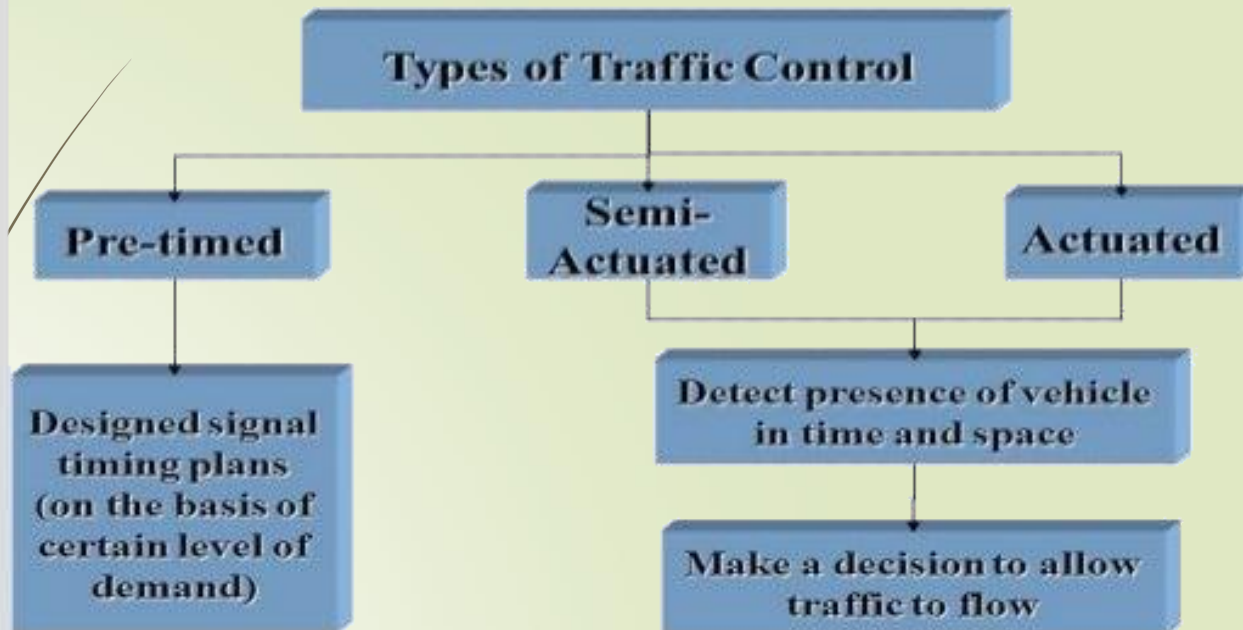
Types of Signal Operation

Traffic signals can operate on a pretimed basis or may be partially or fully actuated by arriving vehicles sensed by detectors. In networks, or on arterials, signals may be coordinated through computer control.



Types of Signal Operation

Types of Signal Operation



Pre -Timed Operation

A signal whose timing(cycle length,green time etc) is fixed over specified time period and does not change in response to changes in traffic flow at the intersection.

No vehicle detection is necessary at this mode of operation.

Semi Actuated Operation

A signal whose timing(cycle length ,green time etc) is affected when vehicle are detected(by video,inductance loop detectors,embedded-pavement etc) on some but not all approaches is called semi-actuated signal.

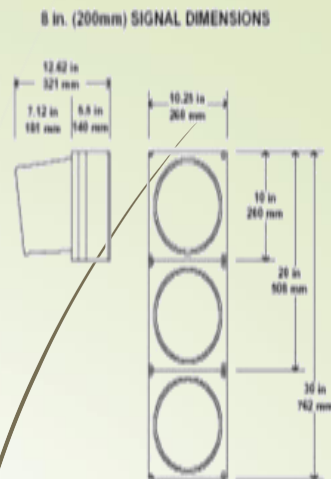
This mode of operation is found where a low volume road intersect a high volume road.

The green returns to the major street when the maximum minor street green is reached or when the detector senses that there is no further demand on the minor street. Semi-actuated operation is often used where the primary reason for signalization is “interruption of continuous traffic,”

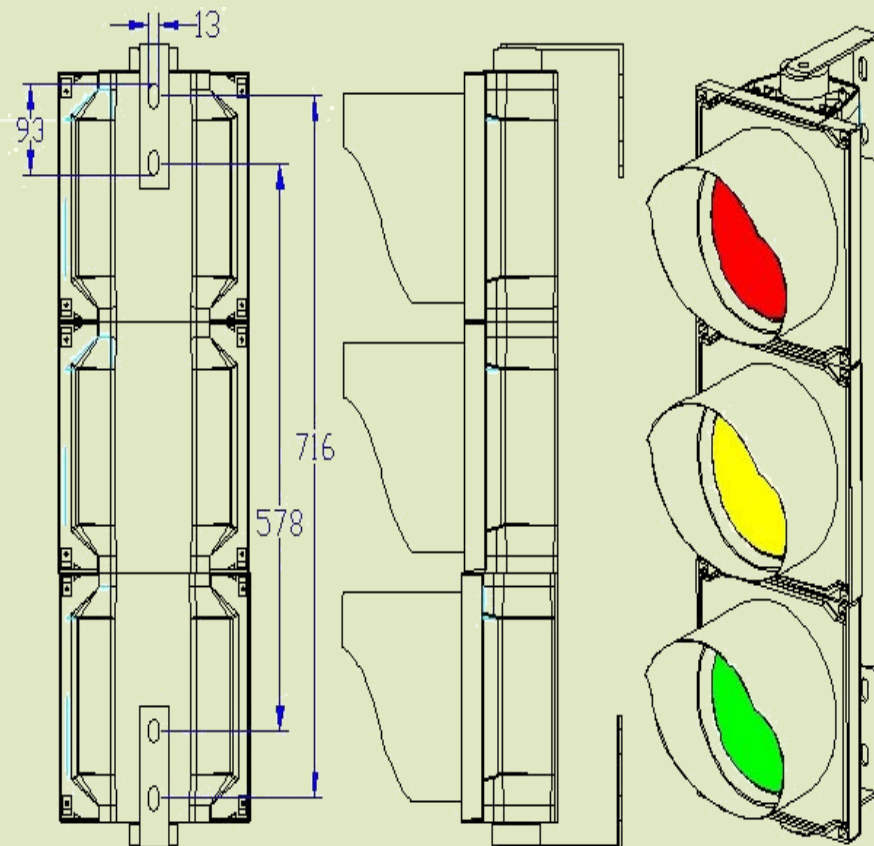
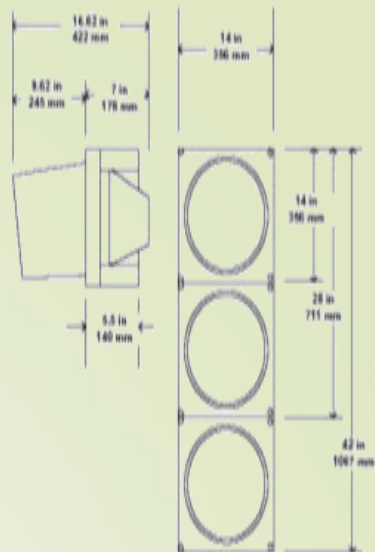
Actuated Operation

In full actuated operation, every lane of every approach must be monitored by a detector. Green time is allocated in accordance with information from detectors and programmed “rules” established in the controller for capturing and retaining the green. In full actuated operation, the cycle length, sequence of phases, and green time split may vary from cycle to cycle.

Dimensions

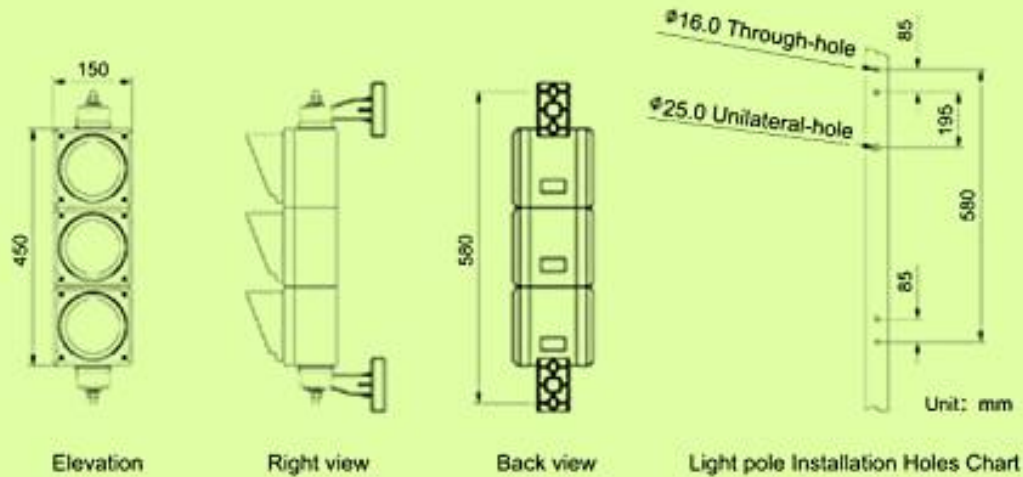


12 in. (300mm) SIGNAL DIMENSIONS

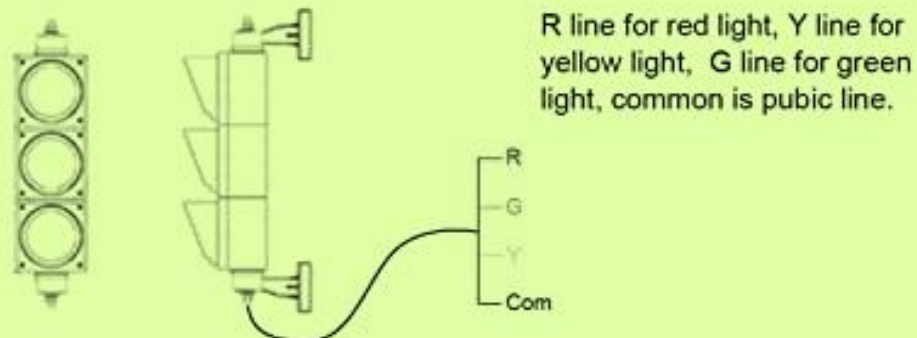


Dimensions

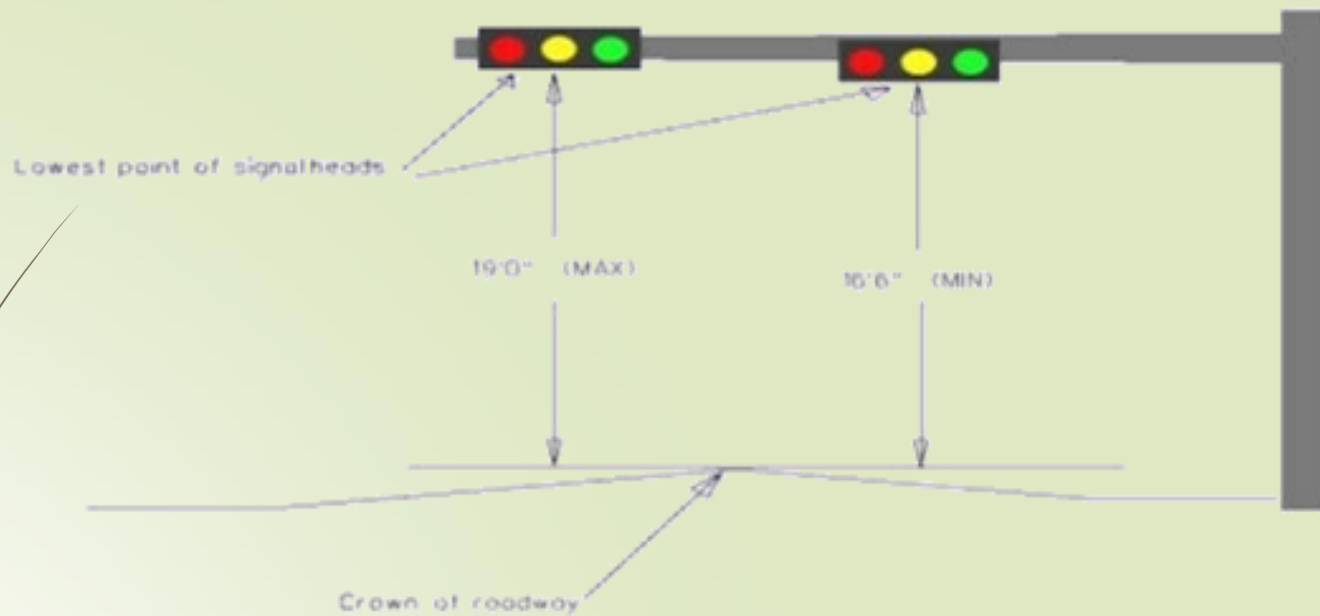
Installation Sketch:



Terminal Connection Sketch:



Height of Signal



Pedestrian Signals

Pedestrian signals are devices used at signalized intersections to notify pedestrians when it is safe to cross the street.

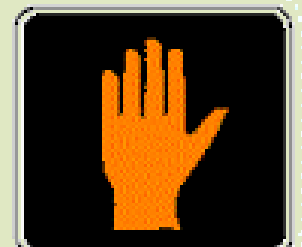
Modern pedestrian signals incorporate countdown timers into their design that display the number of seconds remaining before the signal changes to “Don’t Walk”.

Pedestrian Signals



DONT
WALK

WALK

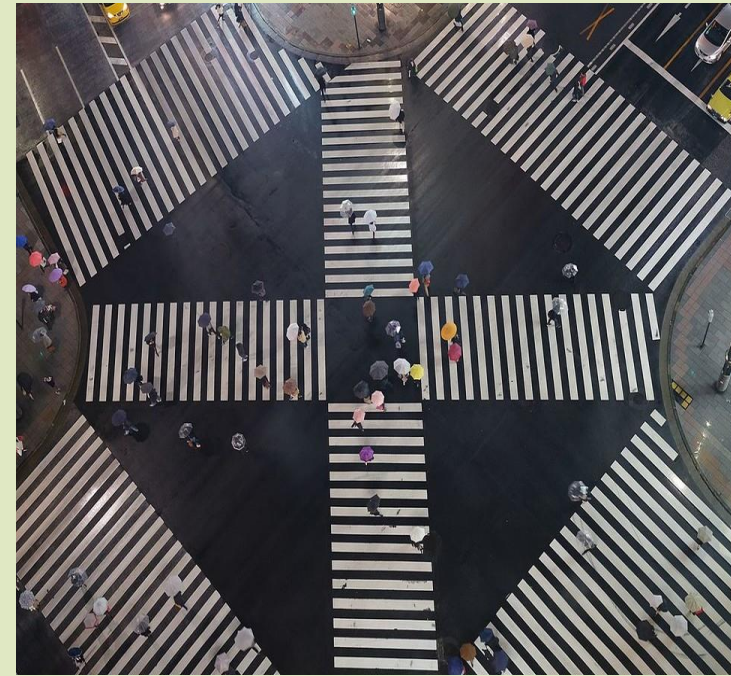


Pedestrian Signals

As a next step, conduct studies to determine if slower walking speeds are appropriate and, if so, what those speeds should be.

Pedestrian ‘scrambles’

Exclusive pedestrian phases (i.e. pedestrian ‘scrambles’) may be used where turning vehicles conflict with very high pedestrian volumes and pedestrian crossing distances are short.



Pedestrian Signals

Pedestrian 'head-start signals'

Leading pedestrian intervals, which give pedestrians a head start before vehicles are given the green, may be considered at signalized intersections with a high incidence of pedestrian conflicts and right-of-way violations.



Pedestrian Signals

Pedestrian countdown signals

- Pedestrian countdown signals are designed to enhance the effectiveness of pedestrian signals at clearing the crosswalk before a signal changes direction.
- Surveys show that most people misinterpret the meaning of the flashing hand of the traditional pedestrian signal.
- Providing the pedestrian countdown device helps pedestrians better interpret the pedestrian signals.
- Countdowns also enable pedestrians to stop on a median refuge, where provided, and wait for the next phase if they find the time left to be too short to finish crossing.
- Pedestrian countdown signals have been shown to have a 25% reduction in pedestrian injury collisions.



Pedestrian Signals

Pedestrian-actuated signals

- Generally, signals on short, fixed time cycles should be used rather than actuated signals (pedestrian push-buttons) to allow consistent crossing opportunities.
- Pedestrian actuation should only be used when pedestrian crossings are intermittent, at locations with relatively long pedestrian clearance time that can result in excessive delay to transit vehicles, and to activate audible pedestrian signals or to provide an extended WALK interval.
- Since many pedestrians fail to notice pushbutton devices, additional research on passive video and infra-red detection should be conducted.
- Timed progression of traffic signals should ensure that sufficient time is allocated per cycle for pedestrian crossings.

