

- **There are two primary types of traffic signal control used throughout HRM - fixed or pre-timed signal operation and actuated signal operation.**

Pre-timed Signals (fixed)

At pre-timed traffic signals each signal phase or traffic movement is serviced in a programmed sequence that is repeated throughout the day. Main street traffic receives a fixed amount of green time followed by the amber and red clearance intervals. The same interval timing is then repeated for the minor or side street. The amount of time it takes to service all conflicting traffic movements is referred to as the cycle length. The signal timings and cycle lengths may vary by time of day to reflect changes in traffic volumes and patterns. During peak traffic periods for example, cycle lengths may range from 90 - 128 seconds to accommodate heavier volumes, particularly on the busier arterial roadways. During off peak times of day cycle lengths are reduced as traffic volumes are much lighter and therefore not as much green time is required to effectively service all movements. With pre-timed signals the pedestrian walk/don't walk signal indications are automatically displayed in conjunction with the green signal for vehicles.

Pre-timed signals can provide fairly efficient operation during peak traffic periods, assuming signal timing settings reflect current conditions. However, during off-peak times, particularly at night, traffic on the major roadways are often stopping for no reason because of little or no traffic or pedestrians on the cross streets. With pre-timed signals the only method to avoid this unnecessary delay was to program the signals for flashing operation during the night time hours, generally 12:30 - 6:00 a.m. Night flash operation was once common practice by many cities and municipalities but with advancements in signal technology and detection devices over the years it is rarely used. Many of the older signals in the former City of Halifax still use night flash but this is gradually being phased out where appropriate.

Actuated Signals

Actuated signal control differs from pre-timed in that it requires “actuation” by a vehicle or pedestrian in order for certain phases or traffic movements to be serviced. Actuation is achieved by vehicle detection devices and pedestrian push buttons. The most common method of detecting vehicles is to install inductive loop wires in the pavement at or near the painted stop bar. Video detection is also used at select locations. Actuated signals consist of two types : semi-actuated and fully-actuated.

Semi-actuated - vehicle loop detectors are installed on the minor street approaches and push buttons are provided for pedestrians wanting to cross the major roadway. The traffic signals remain green on the major roadway until either a cross street vehicle is detected or a pedestrian pushes the button. When this occurs a “call” is sent to the traffic signal controller and at the appropriate time in the cycle main street green will terminate and time its clearance intervals before the minor street is serviced. If the side street is servicing vehicle demand only, a minimum green of 5-7 seconds is provided which can extend up to a preset maximum provided additional vehicles are being detected. After the last vehicle passes over the detector loop or the preset maximum green time has been reached, the signals will return to a green state on main street.

If the side street is servicing a pedestrian demand, the “walk” & “flashing don’t walk” signal indications will be displayed, again at the appropriate time in the cycle. At pedestrian actuated signals, the “walk” indication is displayed for 5-7 seconds. This allows the pedestrian to enter the crosswalk and begin crossing. At the end of the “walk” signal the “flashing don’t walk” indication is displayed which provides the pedestrian already in the crosswalk sufficient time to safely complete their crossing and clear the intersection before conflicting traffic receives a green signal. Pedestrians who are already in the crosswalk at the start of this interval continue to have the right of way over turning vehicles. Pedestrians who have not begun to cross when this interval begins should wait until the next cycle.

Fully-actuated - vehicle detector loops and pedestrian push buttons are installed on all approaches. All signal phases including left turn arrows have preset minimum and maximum greens and will be serviced on demand only. Pedestrians must activate the push buttons in order to receive the “walk” & “flashing don’t walk” indications. A single press of the button locks the “call” in the controllers memory that a pedestrian has requested service. Fully-actuated signals are most efficient at isolated locations where coordination with adjacent signals is not a concern and where the intersecting roadways have similar traffic volumes.

Actuated signal control provides greater efficiency compared to pre-timed signals by servicing cross street traffic and pedestrians only when required. The primary disadvantage with pre-timed signals is avoided as main street traffic is not interrupted unnecessarily. This is particularly beneficial during off peak conditions. The result is fewer stops and delays to traffic on the major arteries, while still providing for safe pedestrian crossings as and when required, which ultimately leads to a decrease in fuel consumption and pollution.

