

Traffic Signal Equipment

Traffic signals are more costly than is commonly realized, even though they represent a sound public investment when justified. A modern signal can cost up to \$150,000. This money pays for:

- Traffic signal controller
- Signal indications
- Vehicle detectors
- Signal poles and supports
- Underground wiring system

The Controller is the signal's brain. It consists of computer controls that operate the selection and timing of traffic movements in accordance with the varying demands of traffic as registered with the controller unit by detectors.

Signal indications in a signal head control traffic in a single direction and consist of three or more signal sections. These usually include solid red, yellow, and green lights and sometimes red, yellow, and green turn arrow lights as well. The signal head can contain three or more signal faces.

Vehicle detectors are devices for indicating the passage or presence of vehicles. In Plano these consist of wire loops placed in the pavement at intersections. They are activated by the change of electrical inductance caused by a vehicle passing over or stopping on the wire loop.

Special Signal Functions

Traffic Signal Preemption

The transfer of signal control to a special signal operation is called preemption. There are three common types of preemption: Railroad, Emergency Vehicle, and Transit Vehicle Preemption.

Railroad Preemption

Railroad preemption is initiated when a train passes over advance detectors located on the tracks ahead of the railroad crossing. The purpose of preemption is to clear tracks of traffic stopped on them.

Emergency Vehicle Preemption

Emergency vehicle preemption is used for fire engines and ambulances. The purpose is to obtain a green light for the emergency vehicle as soon as possible or to hold an existing green light. To obtain a green light, existing green lights, including pedestrian intervals, are shortened. After the yellow light interval, a green light is given to the approach to be used by the emergency vehicle.

In Plano, the emergency vehicle alerts the signal of its approach by means of a special strobe light. The output of the vehicle-mounted strobe is received by a detector at the traffic signal.

Flashing Red

According to the Texas Vehicle Code, when a red lens is illuminated using red flashes, a driver shall stop before entering the crosswalk on the near side of the intersection. The driver may proceed subject to the rules applicable to making a stop at a 4-way stop controlled intersection.

Flashing Yellow

When a yellow lens is illuminated using yellow flashes, a driver may proceed through the intersection or



past the signal only with caution.

Dark Signals

When a traffic signal has gone dark due to power failure, it is considered to function the same way as a 4-way stop controlled intersection; and a driver must stop before entering the intersection.

Signal Timing

Traffic signals assign the right of way to various traffic movements for different time intervals depending on traffic flow levels. Pre-timed signals have preset time intervals for different times of the day including the morning, noon, and evening peak travel periods. The City has a few pre-timed signals remaining in the downtown area. Traffic actuated signals use detectors located in the pavement on the approaches to traffic signals to monitor and assign the right of way on the basis of changing traffic demand. These signals attempt to assign most of the available green time to the heaviest traffic movements.

Coordination of Traffic Signals

The greatest benefits to the public for each dollar spent on traffic operations improvements come from the coordination of adjacent traffic signals. Coordination of traffic signals to facilitate smooth traffic flow (progressed movement) along a street is a proven technique. The quality of flow along a street is affected by the spacing of the signals along the street, the length of the signal cycle length. The amount of traffic and the proportion of green time given to the progressed movements are also important.

Traffic Signal Coordination Goals

Many drivers ask why they have to wait so long for a signal to change. Many of these drivers are waiting to enter a major arterial street from a side street and can be even more frustrated when no traffic can be seen on the major street. To allow coordination with the main street, the side street must wait until the main traffic movement on the arterial has gone through the intersection. It is possible that this traffic can't be seen immediately but will soon be passing through the intersection.

Major coordinated arterials in the City include Preston Road, Coit Road, Custer Road, Independence Parkway, Park Boulevard, Parker Road, Alma Road, Avenue K, Jupiter Road, Plano Parkway, Legacy Drive, and Spring Creek Parkway. The goal of coordination is to get the greatest number of vehicles through the system with the fewest stops. It would be ideal if every vehicle entering the system could proceed without stopping. This is not possible, even in well spaced, well designed systems.

Therefore in traffic coordination the majority rules and the busiest traffic movements are given precedence over smaller traffic movements. Cycle lengths used in Plano are typically around 80 or 90 seconds during off-peak periods. During rush hours, they are between 120 and 160 seconds, depending on the amount of traffic. Therefore, if you miss the green light on the side-street approach to a major street intersection, it is possible you may have to wait the entire length of the cycle to receive another green light.