

Traffic Signal Features for Pedestrians & Bicyclists



Austin Transportation Department
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- Traffic signals are installed based on the Texas MUTCD and an engineering study
- When installed, they typically include:
 - Pedestrian signal heads and marked crosswalks (with ramps) across some or all sides
 - Detection to determine the presence of pedestrians, bicycles, and vehicles

Modes of Traffic Signal Operation

- Night Flash – Used during late evening/early morning hours at some locations
- Coordinated – used to establish a timing relationship between two or more signals
- Free – used when a timing relationship is not needed between signals along one or more roads

- Night Flash: Side street traffic has to stop and wait for a gap to proceed
- Free Mode: Side street typically has short waiting time as movements are served based on traffic present
- Coordinated: Used to provide progression along a roadway and side streets are only served once a cycle within a specific time frame

- Pre-timed signals operate on a predetermined cycle and give green signals each cycle regardless of traffic volumes
- Actuated signals operate based on the presence or absence of traffic

- In coordinated mode, green signals for the side street only occur at programmed intervals to provide signal progression on the major street
- ***Therefore, motor vehicles, bicycles, and pedestrians on the side street should not expect the main street signal to turn yellow as soon as they arrive on the side street***
- Also true for left turns from the major street

Pedestrian Signal Intervals



Allows pedestrians to begin their crossing.
Typically at least 7 seconds long

Pedestrian Signal Intervals



Allows pedestrians to finish their crossing
(assuming a walking speed of 4 feet per
second)

Pedestrian Signal Intervals



Allows pedestrians to finish their crossing and indicates the time remaining

Pedestrian Signal Intervals



Indicates pedestrians should not be in the crosswalk

Accessible Pedestrian Signals



- Provides information in non-visual formats such as audible tones, speech messages, and/or vibrating surfaces)
- Has indicator to show that the signal “sees” the button push
- Being installed at pedestrian hybrid beacons (PHB’s)
- Will also be installed at traffic signals based on pedestrian activity

Pedestrian Hybrid Beacons



A special type of hybrid beacon used to warn and control traffic at an unsignalized location to assist pedestrians in crossing a street or highway at a marked crosswalk

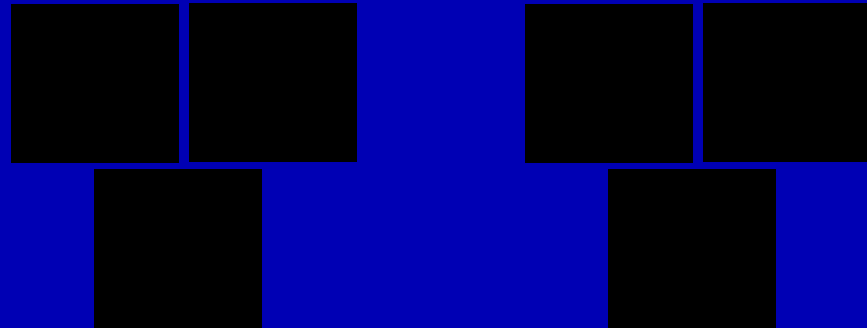
Pedestrian Hybrid Beacon Sequence

Display between pedestrian actuations –

**Pedestrian
Heads**



**Vehicular
Heads**



Pedestrian Hybrid Beacon Sequence

Following a pedestrian actuation –

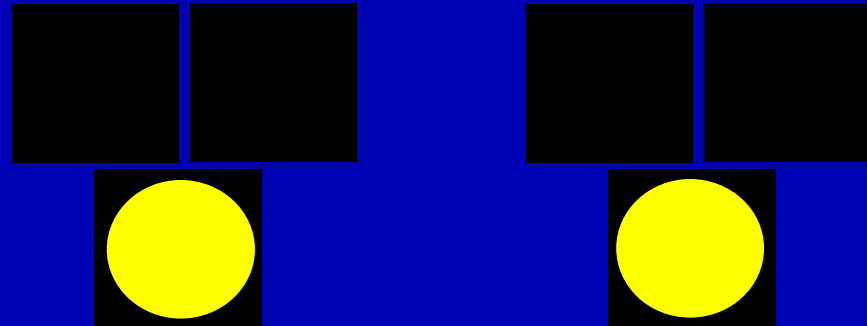
Vehicular heads - flashing circular yellow

Pedestrian heads - remain steady DON'T WALK

**Pedestrian
Heads**



**Vehicular
Heads**



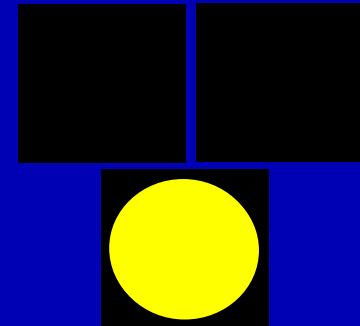
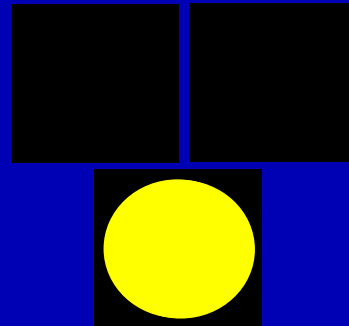
Pedestrian Hybrid Beacon Sequence

Following the flashing circular yellow –
Vehicular heads - steady circular yellow
Pedestrian heads - remain steady DON'T WALK

Pedestrian
Heads



Vehicular
Heads



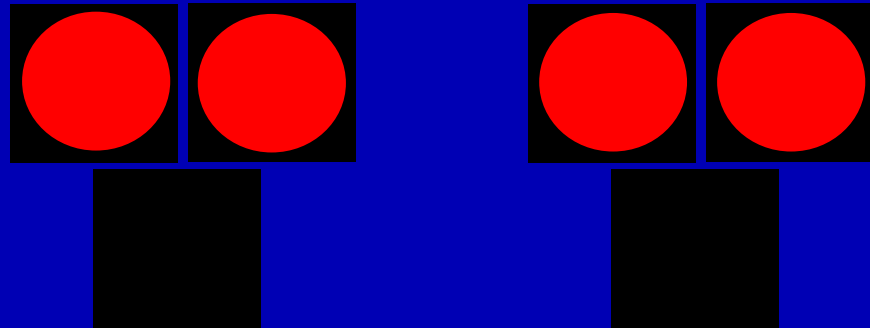
Pedestrian Hybrid Beacon Sequence

Following the steady circular yellow –
Vehicular heads - steady circular red
Pedestrian heads - WALK

Pedestrian
Heads



Vehicular
Heads



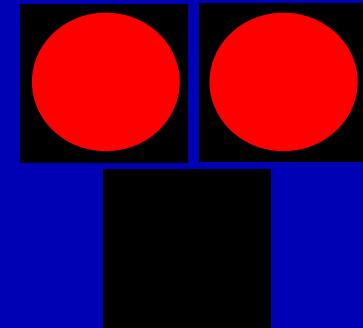
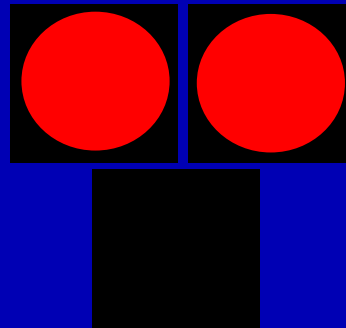
Pedestrian Hybrid Beacon Sequence

Following a pedestrian actuation –
Vehicular heads - alternating flashing red
Pedestrian heads - flashing DON'T WALK & countdown

**Pedestrian
Heads**



**Vehicular
Heads**



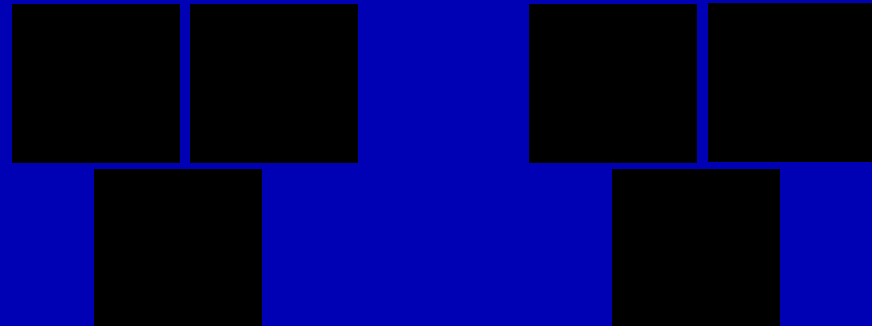
Pedestrian Hybrid Beacon Sequence

then returns to “rest state”

**Pedestrian
Heads**



**Vehicular
Heads**



Traffic Signal features for Bicyclists

- “A person operating a bicycle has the rights and duties applicable to a driver operating a vehicle” (Texas Transportation Code 551.101)
- Bicycle traffic uses the same lanes as motor vehicle traffic where there are no marked bicycle lanes at the intersection
- If marked bicycle lanes extend to the intersection, detection equipment is included for the bicycle lane unless the signal operates pre-timed or on recall

Actuated signal operations

- Typically, the major street green will be served every signal cycle so detection is less critical for that movement
- Reliable detection needed for left turns off the major street (especially protected only left turns) and for all movements from the minor street
- Several different type of detection technology exist

Types of detection

- Inductive loop (loop detector)
- Video camera
- Infrared
- Microwave
- Thermal
- Magnetometer

- Inductive loops, or loop detectors, are the predominate detection technology used at traffic signals in Austin
- Can have different shapes to enhance detection capabilities
- Detection strength can be tuned for proper performance
- Effective for detecting large motor vehicles
- When tuned to detect motorcycles and/or bicycles, they may also detect the presence of vehicles in an adjacent lane

- Hybrid detection that uses a combination of loops and video detection to be tested
- Also considering “push button” type technology for bicycles where a marked bicycle lane exists
- Exploring alternatives to reduce motor vehicle conflicts with bicycles & pedestrians
 - Left turn restrictions based on pedestrian or bicycle detection
 - special signs as shown on the following slides



Cesar Chavez
@
BR Reynolds

and at



Cesar Chavez
@
Sandra Muraida



Challenges

- Detection equipment reliability to detect all vehicle types
- No indication to drivers or riders that they have been detected
- Driver/rider understanding that there is a delay between being detected and receiving a green indication

Challenges

- Balancing conflicting desires:
 - traffic on the major street expects progression along major street with minimal stops
 - Vehicular & pedestrian traffic on intersecting streets expects a green signal with minimal waiting time
 - Progression increases side street delay. Minimizing side street delay reduces quality of progression
 - the more signals & PHB's installed along a street, the greater the challenge of providing progressive traffic flow

We strive to provide a roadway network and signal system that balances the conflicting desires of the different road users in an equitable manner in order to improve traffic flow, air quality, and safety for motorists, transit, bicyclists, and pedestrians.

QUESTIONS