ROAD TRIP
pennsylvania
DEPARTMENT OF TRANSPORTATION
November 2016

Sensing a Need to Change:

Systems Detect Traffic at Intersections

You pull up to a red light at a moderately busy intersection. Your car is stopped at the spot where a side street meets a main roadway. Just when you think the light is never going to turn green —presto it changes.

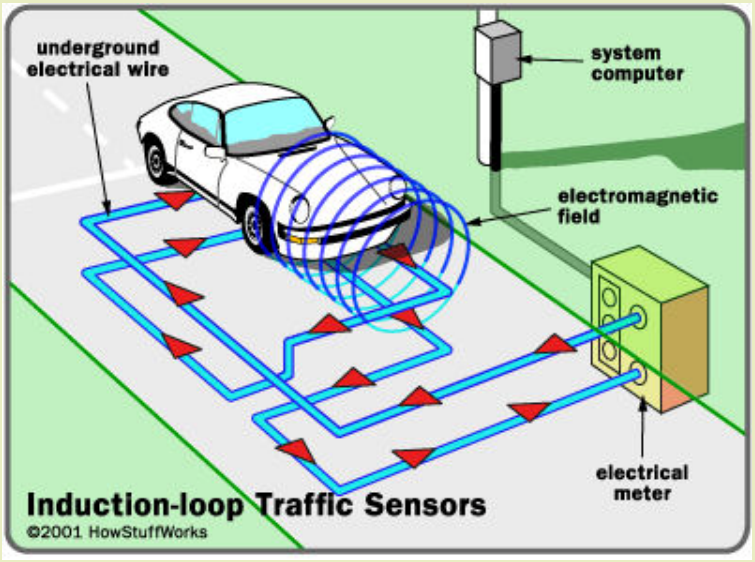
So what determines when the light changes?

Traffic lights at some intersections in Pennsylvania are controlled by timing mechanisms that determine when the lights change on a never ending loop. The length of time lanes are given a green light varies from intersection to intersection and sometimes between lanes and streets within an intersection.

At some intersections, a timing mechanism can be less efficient. Traffic on the main road could be stopped despite the fact that no vehicles are approaching from other streets. In these cases, a method of detection can be used to determine if and when the traffic lights need to change.

In Pennsylvania, there are three types of detectors that are commonly used in conjunction with traffic lights. Each has its advantages and drawbacks.

The first is known as a traffic loop sensor. This tried and true method involves putting a wire in the pavement near the stop bar painted on the pavement. A magnetic field runs through the wire. When a vehicle pulls on top of the wire, the magnetic field changes, alerting a computer system of a need to change the lights.
Advantage: This system is very reliable at detecting most motor vehicles and has lower maintenance costs than other types of detectors.
Drawback: Utility workers must be careful not to disrupt the loop whenever completing nearby projects.



This graphic by www.HowStuffWorks.com shows the mechanics of an induction-loop traffic sensor.

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Covered in this issue:

Embedded Tech and Engineering Topics — Microwave, light reflections, magnetic fields

Vocabulary Terms — Mechanism, detector

Want to have "**Road Trip**" sent directly to your email every other month? Submit your email address to jharry@pa.gov and you'll be added to the list.

The newsletter is also available online at www.penndot.gov/RegionalOffices/district-1.

What Does a Flashing Traffic Light Mean?

A flashing red light has the same meaning as a **STOP** sign. You must come to a complete stop. Then, look both ways, and proceed only after the intersection is clear.

A flashing yellow light means **CAUTION**. Slow down, look and proceed with care.

Police on the Lookout for Dangerous Aggressive Drivers

Aggressive driving behaviors are among the leading causes of highway crashes and fatalities in Pennsylvania. Among the driving habits often considered aggressive are racing to beat red lights, failing to yield the right of way to oncoming traffic, tailgating, speeding, and illegal passing.

To deter aggressive driving and make Pennsylvania's highways safer for all, PennDOT partners with state and local police to conduct aggressive driving enforcements.

One such mobilization started on October 24 and continues through November 20.

DID YOU KNOW… In 2014, the economic loss due to traffic crashes was $1,103 to every man, woman, and child in Pennsylvania, according to PennDOT data.

Detectors Installed at Intersections on a Case-by-Case Basis

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Video is another way to detect traffic waiting at a red light. The camera, which is mounted on or near the traffic light, memorizes the light reflections of the roadway as it appears with no vehicles on it. When a vehicle enters the camera's view, the reflections change and the traffic light system is activated. **Advantage**: This system more easily picks up smaller vehicles, like motorcycles, than a loop sensor. **Drawback:** The camera is not as effective in inclement weather.

The third type of a traffic detector is a radar unit. Also mounted on or near the light, the radar sends microwaves, which bounce off vehicles sitting in the roadway, indicating the light needs to change. **Advantage**: This system is efficient at detecting smaller vehicles without issues during inclement weather. **Drawback:** This detector is usually the most expensive to install and maintain.

Regardless of which detector is used, the traffic light system will also have a timing mechanism to control how long each lane receives a green light.

When it comes to deciding which detector method will be used at an intersection, PennDOT meets with the local municipality to gather feedback and preferences.

Each intersection is evaluated on a case-by-case basis to determine which lanes need detectors and what the appropriate length of time for a green light would be.

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