

# Getting Vehicle Detectors to Detect Bicycles

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Many traffic lights are controlled by “vehicle detectors”. Typically, these detectors work through magnetic induction using loops of wire buried in the pavement to sense the presence of a vehicle (actually any conductor) by the disturbance it creates in the magnetic field of the loop.

Bicycles have much less metal than motor vehicles, thus it can be somewhat more difficult to make loop detectors sense bicycles. There are several patterns of wire loops. Most older loops are simple dipoles (rectangles). Many newer types utilize a double loop (quadrapole) that incorporates a third wire running down the center of the rectangle. The double loop type is generally better able to detect bicycles and it has a wider “sweet spot” in the middle. However, even most dipole loops can be made to work if they are adjusted carefully and if cyclists know where to stop. (See figure 1 below for depiction of these loops.)

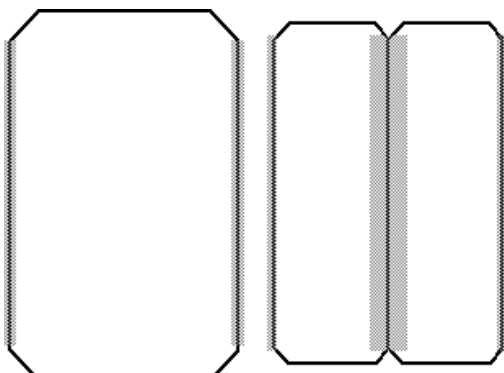
Since a bicycle has very little metal compared to a motor vehicle, cyclists must generally stop directly over a wire loop (sometimes within 1 cm) to “trigger” the detector. This causes problems. (1) Few people know how these detectors work. (Automobile drivers do not have to know.) (2) If cyclists cannot see the wire cuts, they cannot see where to place their wheels. (3) Some detectors are insufficiently sensitive even if the bicycle is directly over a wire,

Communities should mark detectors with a stencil such as is shown in Figs 2-3. The stencil must be accurately located along the “sweet spot” of the detector. In any case, the detectors must be tested and adjusted to ensure they work properly and people must be taught how to use the detectors. Motorcycle operators report similar problems with non-working vehicle detectors.

Malfunctioning detectors contribute to the attitude of many cyclists that they should not be governed by traffic laws. Detectors that do not detect all traffic must be regarded as “broken” and they must be fixed promptly.

There are other detector styles. These include different patterns, such as the Caltrans “diagonal type D” as well as other technologies, such as photo or video detectors. Some of these may be better at detecting bicycles and motorcycles.

For more information, see two articles on the Web: “Re-Evaluating Signal Detector Loops” by Alan Wachtel at [www.bikeplan.com/aw-signals.pdf](http://www.bikeplan.com/aw-signals.pdf) and “Detection of Bicycles by Quadrapole Loops at Demand-Actuated Traffic Signals” by Steven Goodridge at <http://humantransport.org/bicycledriving/library/signals/detection.htm>.



Simple dipole loop

Quadrapole loop

Fig 1 – Vehicle detector loops. Shading depicts sensitive “sweet spots”



Fig 2 – Vehicle detector stencil



Fig 3 – Marked detectors at NASA

## Bicycle Detector Symbol

Excerpt from the *Manual on Uniform Traffic Control Devices, Part 9 Traffic Controls for Bicycle Facilities*, 2003 Edition, <http://mutcd.fhwa.dot.gov/>

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### Section 9C.05 Bicycle Detector Symbol

Option:

A symbol (see Figure 9C-7) may be placed on the pavement indicating the optimum position for a bicyclist to actuate the signal.

**Figure 9C-7. Example of Bicycle Detector Pavement Marking**

