CLAIMS

1. An on-vehicle control device configured to control a traveling speed of a vehicle including the on-vehicle control device, the on-vehicle control device comprising:

an acquisition unit configured to acquire a present light color of a traffic light unit installed at an intersection;

a calculation unit configured to calculate an avoidance position and an avoidance speed with respect to a dilemma zone at a time when yellow light starts; and

a control unit configured to execute a first deceleration process of reducing the traveling speed of the vehicle at the avoidance position to a speed equal to or lower than the avoidance speed, in a case where a present position of the vehicle is on an upstream side relative to the avoidance position and the present light color is green.

2. The on-vehicle control device according to claim 1, wherein

the control unit executes a second deceleration process of causing the vehicle to stop before the intersection, in a case where the present position of the vehicle is on the upstream side relative to the avoidance position and the present light color is yellow.

3. The on-vehicle control device according to claim 1 or 2, wherein

the control unit executes a passage determination process of determining whether or not to cause the vehicle to pass through the intersection, according to the traveling speed of the vehicle at the avoidance position, in a case where the present position of the vehicle coincides with the avoidance position or is on a downstream side relative to the avoidance position.

4. The on-vehicle control device according to any one of claims 1 to 3, wherein

in a case where the acquisition unit acquires, as traffic signal information at the

intersection, only the traffic light color or only the traffic light color and a yellow interval, the calculation unit calculates the avoidance position and the avoidance speed by using a straight line Ls described below:

$$Ls = Y \times V$$

where Y is the yellow interval, and V is the traveling speed.

5. The on-vehicle control device according to any one of claims 1 to 3, wherein

in a case where the acquisition unit further acquires, as traffic signal information at the intersection, traffic signal information in which a minimum number of remaining seconds of green light is different from a maximum number of remaining seconds of the green light, the calculation unit calculates the avoidance position and the avoidance speed by using a straight line Lsg described below:

$$Lsg = (Y+Gmin) \times V$$

where Y is the yellow interval, Gmin is the minimum number of remaining seconds, and V is the traveling speed.

6. A method of controlling a traveling speed of a vehicle, comprising:

acquiring a present light color of a traffic light unit installed at an intersection;

calculating an avoidance position and an avoidance speed with respect to a dilemma zone at a time when yellow light starts; and

executing a first deceleration process of reducing the traveling speed of the vehicle at the avoidance position to a speed equal to or lower than the avoidance speed, in a case where a present position of the vehicle is on an upstream side relative to the avoidance position and the present light color is green.

7. A computer program configured to cause a computer to function as an on-vehicle control device that controls a traveling speed of a vehicle including the on-vehicle control device, the computer program causing the computer to function as:

an acquisition unit configured to acquire a present light color of a traffic light unit installed at an intersection;

a calculation unit configured to calculate an avoidance position and an avoidance speed with respect to a dilemma zone at a time when yellow light starts; and

a control unit configured to execute a first deceleration process of reducing the traveling speed of the vehicle at the avoidance position to a speed equal to or lower than the avoidance speed, in a case where a present position of the vehicle is on an upstream side relative to the avoidance position and the present light color is green.