

Acceleration Math Question

Before I get into the actual “question” – the legal issues. Figure 1 is a copy of the California Vehicle code regarding turning Right on a Red light indicator.

Circular Red or Red Arrow

21453. (a) A driver facing a steady circular red signal alone shall stop at a marked limit line, but if none, before entering the crosswalk on the near side of the intersection or, if none, then before entering the intersection, and shall remain stopped until an indication to proceed is shown, except as provided in subdivision (b).

(b) Except when a sign is in place prohibiting a turn, a driver, after stopping as required by subdivision (a), facing a steady circular red signal, may turn right, or turn left from a one-way street onto a one-way street. A driver making that turn shall yield the right-of-way to pedestrians lawfully within an adjacent crosswalk and to any vehicle that has approached or is approaching so closely as to constitute an immediate hazard to the driver, and shall continue to yield the right-of-way to that vehicle until the driver can proceed with reasonable safety.

(c) A driver facing a steady red arrow signal shall not enter the intersection to make the movement indicated by the arrow and, unless entering the intersection to make a movement permitted by another signal, shall stop at a clearly marked limit line, but if none, before entering the crosswalk on the near side of the intersection, or if none, then before entering the intersection, and shall remain stopped until an indication permitting movement is shown.

(d) Unless otherwise directed by a pedestrian control signal as provided in Section 21456, a pedestrian facing a steady circular red or red arrow signal shall not enter the roadway.

Amended Sec. 1, Ch. 14, Stats. 2001. Effective January 1, 2002.

Figure 1

Figures 2 and 3 are copies of the instructions of the California Driver’s Handbook; required reading and memorization for obtaining a California Driver’s License.

 **California Driver Handbook - Traffic Lights and Signs**

Traffic Signal Lights

Solid Red—A red signal light means “STOP.” You can make a right turn against a red light after you stop then yield to pedestrians, bicyclists, and vehicles close enough to be a hazard. Make the right turn only when it is safe. Do not turn if a “NO TURN ON RED” sign is posted.

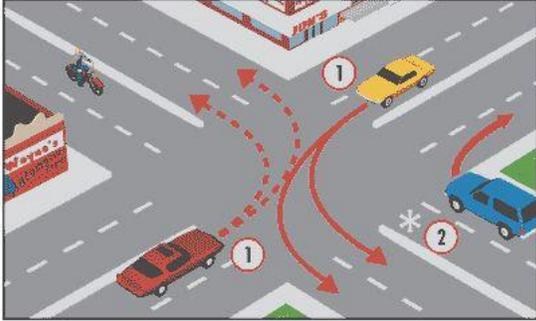


Figure 2

Examples Of Right and Left Turns

The numbers on the cars in the diagrams refer to the numbered sentences on these pages. Always use your turn signals.

1. *Left turn from a two-way street.* Start the turn in the left lane closest to the middle of the street. Complete the turn, if safe, in either lane of the cross street (shown by the arrows). Use the center left turn lane if one is available. A left turn may be made from the other lane, if permitted by signs or arrows.



2. *Right turn.* Begin and end the turn in the lane nearest the righthand curb. Do not swing wide into another lane of traffic. Watch for pedestrians, motorcyclists, and bicyclists between your vehicle and the curb. Sometimes, signs or pavement markings will let you turn right from another lane as shown by the graphic 2.

Figure 3

In Figure 1 the functional part pertaining to my question (not asked yet) is the description of the law; “... and to any vehicle that has approached or is approaching so closely as to constitute an immediate hazard to the driver, and shall continue to yield right-of-way to that vehicle until the driver can proceed with reasonable safety.” You will note that the portions underlined are equally vague in the Driver’s handbook; Figure 2 “. . . close enough to be a hazard...” and not mentioned at all in Figure 3.

Therefore the rationale behind my legal question is; how does one define the “immediate hazard” and “reasonable safety” under the guidance of “close enough to be a hazard”. Secondary to that; who is the driver? It certainly reads that I would be that driver; however, I would think that the law should address the others that I could place at risk. In Figure 4, you will see an example of a primary intersection near my house with no Right Turn Arrow circular light. Just a simple Circular Red light is present.



Figure 4

The **red** line indicates my vehicle’s approach and CPA to the cross walk at the controlled intersection approaching from the north. I am to wait there until the stated *vague conditions exist* and then as guided by the Driver’s Handbook I can proceed along either one of the two **green** lined arrows. Provided I have not created an “immediate hazard” nor has my vehicle become “close enough to be a hazard” to vehicles traveling along Poway Road as indicated by the **blue** lines and arrows.

Therefore my question comes down to a computation of distance, and acceleration. Distance between two cars traveling west on Poway Road, and my acceleration to a location between them.

SO, I'm sitting at the intersection with cars passing me from left to right (east to west) and I am looking for the proper spacing between two cars where I can commence my turn and accelerate so that I don't hit (or even touch) the car that just passed and the one coming next doesn't hit me, nor does he have to adjust his speed by backing off the gas, or stepping on the brake. At this particular intersection they are traveling somewhere between 45 and 50 MPH.

Therefore the questions are:

1. How large a gap does there have to be between the two cars? (So I can fit in and avoid the "Legal issues".)
2. When exactly do I start to accelerate? (I have determined that, this must be when the lead car (before the gap) is in front of me = but when?)
3. When do I commence the turn to the right? (This has to be determined because a car accelerating AND turning; is not the best condition for maintaining traction = THIS, I proved with test runs.)
4. What is the rate of acceleration I have to achieve? (Because I want to "close" the lead car as rapidly as possible so that the second car does not perceive my car as a potential hazard.)
5. How long do I accelerate? (Because I don't want to hit the lead car, or be hit by the second car.)

There is one more overall question that comes into play what is the eye, foot coordination / reaction time; that ties all of the five questions together. And assume that the car is fully capable of reproducing the results of the testing that will be provided to answer the questions.

In addition to the testing results that will be provided are video clips and a Power Point Presentation entitled "Distances and Perspectives". This document and the references provided here by shared Dropbox are the foundation for the question and the research to provide the answers. If you have any additional questions that require illumination with testing, distances or perspectives please let me know and I will supply them.