



Brian Ceccarelli

Entrapment – Maryland

The State of Maryland entraps drivers. Entrapment is illegal in the United States.¹ The Maryland Driver's Manual gives drivers bad advice on how to respond to yellow lights. The advice contradicts the engineering operational directives of yellow lights. Obeying the Maryland Driver's Manual causes drivers to run red lights.

The Maryland manual says that the yellow provides the time to stop safely. Incorrect. The yellow light provides half the time to stop safely. (The length of the yellow light is exactly half the time it takes you to stop your car.) The Maryland manual says the yellow provides time to clear other vehicles through the intersection. Incorrect. The yellow light does not provide any time for vehicles to clear the intersection. Clearing vehicles through the intersection is the purpose of the all-red clearance interval and Maryland's yellow light duration does not include the all-red clearance time. The Maryland manual says that drivers must slow down and proceed for a steady yellow arrow signal. Incorrect. Any yellow light, whether for a straight-through or turn lane, is only long enough for a driver to proceed into the intersection provided the driver proceeds at the speed limit or more. Upon seeing a yellow light, drivers have only two choices. 1) Stop or 2) proceed at the speed limit or more.

From the Maryland Driver's Manual:²

Steady Yellow Signal. This means that the signal is changing from green to red. Its purpose is to provide time for approaching traffic to stop safely and to clear other vehicles from the intersection before the signal turns red.

Maryland uses the Institute of Transportation Engineers (ITE) yellow change formula to set yellow light durations.³ ITE says some drivers upon seeing a yellow light *must* continue at the speed limit and some *must* even accelerate to beat the light. Slowing down is never an option.⁴

At the termination of a green phase, motorists approaching a signalized intersection are advised by a yellow signal indication that the red interval is about to commence.³⁵ The speed and location of some approaching vehicles will be such that they can stop safely at the stop line; others will have to continue at their speed or even accelerate into or through the intersection.

Maryland also sets the requirements for approach speed, perception-reaction time and deceleration rate⁵ for the formula:

1. The approach speed must be set higher of the 85th percentile speed or the posted speed limit.
2. Use 1.0 second perception-reaction time.
3. Where heavy truck traffic comprises less than 15% of the vehicle traffic on the approach, use 10.0 ft/s² deceleration rate.
4. When heavy truck traffic comprises 15% or more of the vehicle traffic on the approach, use 8.0 ft/s² deceleration rate.

Maryland also requires the result of the formula to be rounded *up* to nearest *half second*³.

Note:

1. Given Maryland's modeled constants for perception-reaction time and deceleration rate, Maryland compels heavy truck drivers to run red lights when less than 15% of the vehicle traffic is heavy trucks.
2. The yellow light durations for turn lanes and straight-through lanes are the same. The *Annotated Code of Maryland* does not differentiate one lane from the other. This means that if the straight-through yellow duration is 4.5 seconds, so must be the protected left-turn phase's yellow duration.

Commercial Truck Drivers

For commercial truck drivers in Maryland, the *Maryland Commercial Driver License Manual* opposes the *Annotated Code of Maryland*. Maryland sets the yellow light durations two seconds shorter than what all commercial truck drivers require. Because Maryland's right hand does not know what its left hand is doing, Maryland entraps all truck drivers at signalized intersections.

Different Perception-Reaction Times

The *Maryland Commercial Driver License Manual* states:

1. That the "average perception time for an alert driver is 1.75 seconds."⁶
2. That the "average driver has a reaction time of 0.75 seconds to 1 second."⁶

Therefore the minimum Maryland combined perception-reaction time for the average driver is 1.75 + 0.75 seconds = 2.5 seconds.

- The *Annotated Code of Maryland* requires 1.0 second.
- The *Maryland Commercial Driver License Manual* requires 2.5 seconds. (The American Association of State Traffic Highway Officials (AASHTO) recommends 2.5 seconds perception-reaction time for all drivers⁷.)

Commercial Manual Mistakenly Gives Dangerous Deceleration Rate

When computing the braking distance, the *Maryland Commercial Driver License Manual* gives dangerous advice to truck drivers. Without saying it explicitly, the Manual is computing the braking distance using a deceleration rate normally associated only with emergency braking. It is a deceleration rate achieved only when a truck driver slams on his brakes as hard as he can. But the context of this chapter and others in the Manual is not emergency braking.

The implied deceleration rate contradicts the Annotated Code of Maryland.

The *Maryland Commercial Driver License Manual* says that under ideal conditions, “At 55 mph on dry pavement with good brakes, it can take about 216 feet”⁶ to come to a stop. 216 feet represents a deceleration rate of 15.1 ft/s².

The braking distance formula from the laws of physics is:

$$d = \frac{v^2}{2a}$$

where v is the initial speed of the vehicle and a is the deceleration rate. The Commercial Driver License Manual gives values for d and v. The question is, “What is the deceleration rate Maryland’s Manual implies? Algebraically isolate a:

$$a = \frac{v^2}{2d} = \frac{(55 * 1.47)^2}{2 * 216} = 15.1 \text{ ft/s}^2$$

15.1 ft/s² is the Manual’s implied deceleration rate. A rate which can cause a truck to fishtail and can only be achieved under emergency braking conditions⁸.

- The *Maryland Commercial Driver License Manual* says out of context that the deceleration rate of a heavy truck is 15.1 ft/s².
- The *Annotated Code of Maryland* states the heavy trucks decelerate at 8.0 ft/s². 8.0 ft/s² is consistent with all the literature about the comfortable safe-braking deceleration rate of commercial trucks.

Yellow Duration Does Not Accommodate Air Brake Lag Time

The *Maryland Commercial Driver License Manual* states that trucks with air-brakes require an additional 0.5 seconds to stop because it takes a minimum of 0.5 seconds for the air to flow through the lines to the brakes⁹.

- The *Annotated Code of Maryland's* yellow light duration does not provide yellow time for air-brake lag time.
- The *Maryland Commercial Driver License Manual* requires trucks with air brakes to have at additional minimum of 0.5 seconds.

References

¹ Danny Glover, Jr., et. al, [Entrapment in North Carolina](#), (2012).

² Maryland Motor Vehicle Administration, [Maryland Driver's Manual](#), Maryland Department of Transportation, **12** (2012).

³ Maryland Division of State Documents, Annotated Code of Maryland, Title 11 Department of Transportation, Subtitle 04 State Highway Administration, Chapter 14 Traffic Control Signal Monitoring Systems—[Duration of Yellow Signal Indications, Section 03](#) (2012).

⁴ Institute of Transportation Engineers, [Transportation and Traffic Engineering Handbook, Second Edition](#), Institute of Transportation Engineers, **759** (1982).

⁵ Maryland Division of State Documents, Annotated Code of Maryland, Title 11 Department of Transportation, Subtitle 04 State Highway Administration, Chapter 14 Traffic Control Signal Monitoring Systems—[Duration of Yellow Signal Indications, Section 02](#) (2012).

⁶ Maryland Motor Vehicle Administration, [Maryland Commercial Driver License Manual](#), Maryland Department of Transportation, **2-14** (2005).

⁷ American Association of State Highway and Transportation, [A Policy on Geometric Design of Highways and Streets](#), **50-56, 110-111** (2004).

⁷ Fawzi P. Bayan, et. al, [Brake Timing Measurements for a Tractor-Semitrailer Under Emergency Braking](#), Publication 2009-01-2918, Scientific Expert Analysis Limited, **5** (2009).

⁸ Maryland Motor Vehicle Administration, [Maryland Commercial Driver License Manual](#), Maryland Department of Transportation, **5-8** (2005).