



**HUMAN PERFORMANCE FACTORS ATTACHMENT**

**California Commercial Driver Handbook,**

**Section 2: Driving Safely, Controlling Your Speed**

**HWY20MH002**

(5 pages)

- If you stop on a 2-lane road carrying traffic in both directions or on an undivided highway, place warning devices within 10 feet of the front or rear corners to mark the location of the vehicle and 100 feet behind and ahead of the vehicle, on the shoulder or in the lane you stopped in. See Figure 2.9.
- Back beyond any hill, curve, or other obstruction that prevents other drivers from seeing the vehicle within 500 feet. If line of sight view is obstructed due to hill or curve, move the rear-most triangle to a point back down the road so warning is provided. See Figure 2.10.

When putting out the triangles, hold them between yourself and the oncoming traffic for your own safety. (So other drivers can see you.)

**Use Your Horn When Needed.** Your horn can let others know you are there. It can help to avoid an accident. Use your horn when needed. However, it can startle others and be dangerous when used unnecessarily.

## 2.6 – CONTROLLING YOUR SPEED

Driving too fast is a major cause of fatal accidents. You must adjust your speed depending on driving conditions. These include traction, curves, visibility, traffic, and hills.

### 2.6.1 – Stopping Distance

**Perception Distance + Reaction Distance + Braking Distance = Total Stopping Distance**

- **Perception Distance.** This is the distance your vehicle travels, in ideal conditions, from the time your eyes see a hazard until your brain recognizes it. Keep in mind, certain mental and physical conditions can affect your perception distance. It can be affected greatly, depending on visibility and the hazard itself. The average perception time for an alert driver is 1 3/4 seconds. At 55 mph, this accounts for 142 feet traveled.
- **Reaction Distance.** This is the distance you will continue to travel, in ideal conditions, before you physically hit the brakes, in response to a hazard seen ahead. The average driver has a reaction time of 3/4 second to 1 second. At 55 mph, this accounts for 61 feet traveled.

One-Way or Divided Highway

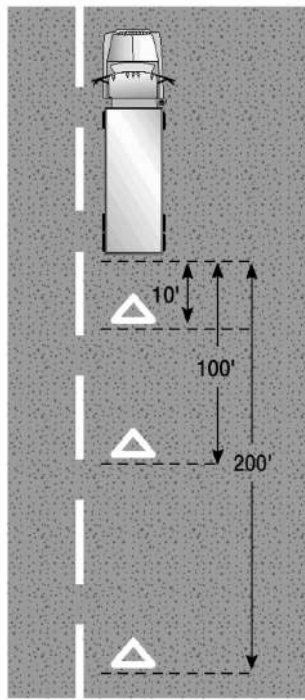


Figure 2.8

Two-Way or Undivided Highway

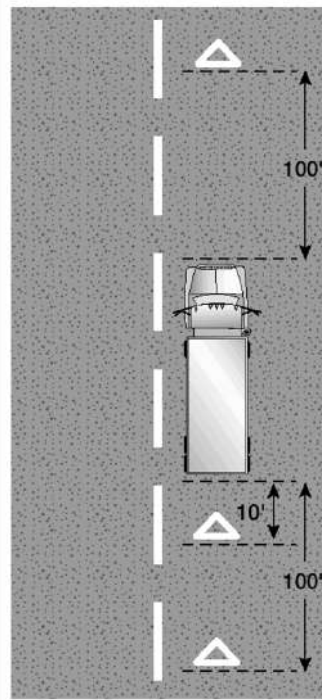


Figure 2.9

OBSTRUCTED VIEW

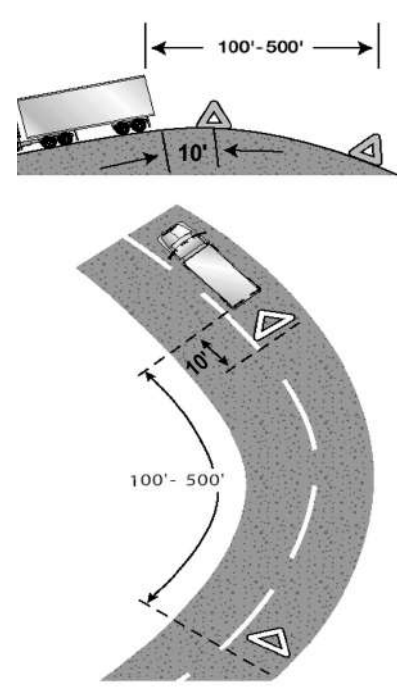


Figure 2.10

- **Braking Distance.** This is the distance your vehicle will travel, in ideal conditions, while you are braking. At 55 mph, on dry pavement with good brakes, it can take about 216 feet.
- **Total Stopping Distance.** The total minimum distance your vehicle has traveled, in ideal conditions, with everything considered, including perception distance, reaction distance, and braking distance, until you can bring your vehicle to a complete stop. At 55 mph, your vehicle will travel a minimum of 419 feet. Figure 2.11 shows the American football field in using distance.

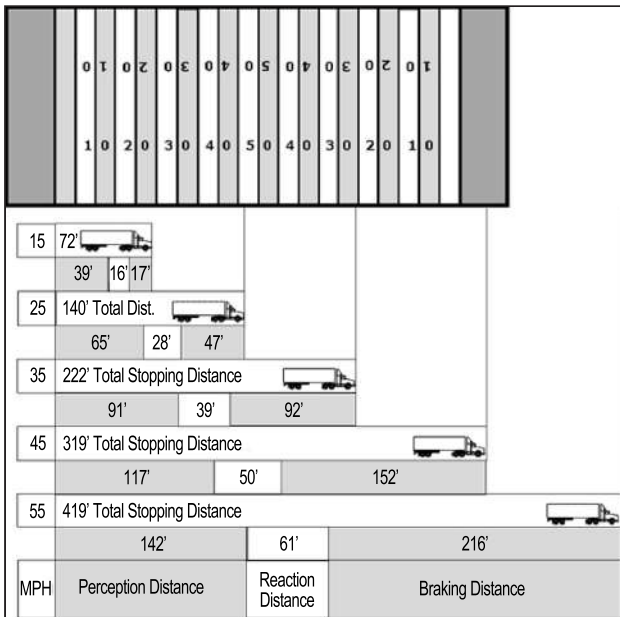


Figure 2.11

**Effect of Speed on Stopping Distance.** The faster you drive, the greater the impact or striking power of your vehicle. When you double your speed from 20 to 40 mph, the impact is 4 times greater. The braking distance is also 4 times longer. Triple the speed from 20 to 60 mph and the impact and braking distance is 9 times greater. At 60 mph, your stopping distance is greater than the length of an American football field. Increase the speed to 80 mph and the impact and braking distance are 16 times greater than at 20 mph. High speeds greatly increase the severity of accidents and stopping distances. By slowing down, you can reduce braking distance.

**Effect of Vehicle Weight on Stopping Distance.** The heavier the vehicle, the more work the brakes must do to stop it and the more heat they absorb. The brakes, tires, springs, and shock absorbers on heavy vehicles are designed to work best when the vehicle is fully loaded. Empty trucks require greater stopping distances because an empty vehicle has less traction.

**Control and Stopping Requirements.** The service brake must hold the vehicle or combination of vehicles stationary on any grade on which it is operated under all conditions of loading or unloading (CVC §26454).

The service brakes of every motor vehicle or combination of vehicles must be capable of stopping from an initial speed of 20 mph as follows maximum stopping distance (MSD) in feet:

- Passenger vehicle—25 MSD
- Single motor vehicle with a manufacturer’s GVWR of less than 10,000 pounds—30 MSD
- Single motor vehicle with a manufacturer’s GVWR of 10,000 pounds or more, or any bus—40 MSD
- Combination of vehicles consisting of a passenger vehicle or any motor vehicle with a manufacturer’s GVWR of less than 10,000 pounds in combination with any trailer, semitrailer, or trailer coach—40 MSD
- All other combinations of vehicles—50 MSD

## 2.6.2 – Matching Speed to the Road Surface

You cannot steer or brake a vehicle unless you have traction. Traction is friction between the tires and the road. Some road conditions reduce traction and call for lower speeds.

**Slippery Surfaces.** It will take longer to stop, and it will be harder to turn without skidding, when the road is slippery. Wet roads can double stopping distance. You must drive slower to be able to stop in the same distance as on a dry road. Reduce speed by about 1/3 (for example, slow from 55 to about 35 mph) on a wet road. On packed snow, reduce speed by a half or more. If the surface is icy, reduce speed to a crawl and stop driving as soon as you can safely do so.

**Identifying Slippery Surfaces.** Sometimes it is hard to know if the road is slippery. Here are some signs of slippery roads:

- **Shaded Areas.** Shady parts of the road will remain icy and slippery long after open areas have melted.
- **Bridges.** When the temperature drops, bridges will freeze before the road will. Be especially careful when the temperature is close to 32 degrees Fahrenheit.
- **Melting Ice.** Slight melting will make ice wet. Wet ice is much more slippery than ice that is not wet.
- **Black Ice.** Black ice is a thin layer that is clear enough that you can see the road underneath it. It makes the road look wet. Any time the temperature is below freezing and the road looks wet, watch out for black ice.
- **Vehicle Icing.** An easy way to check for ice is to open the window and feel the front of the mirror, mirror support, or antenna. If there is ice on these, the road surface is probably starting to ice up.
- **Just After Rain Begins.** Right after it starts to rain, the water mixes with oil left on the road by vehicles. This makes the road very slippery. If the rain continues, it will wash the oil away.

**Hydroplaning.** In some weather, water or slush collects on the road. When this happens, your vehicle can hydroplane. It is like water skiing—the tires lose their contact with the road and have little or no traction. You may not be able to steer or brake. You can regain control by releasing the accelerator and pushing in the **clutch**. This will slow your vehicle and let the wheels turn freely. If the vehicle is hydroplaning, do not use the brakes to slow down. If the drive wheels start to skid, push in the clutch to let them turn freely.

It does not take a lot of water to cause hydroplaning. Hydroplaning can occur at speeds as low as 30 mph if there is a lot of water. Hydroplaning is more likely if tire pressure is low, or tread is worn. (The grooves in a tire carry away the water: if the grooves are not deep, they do not work well.)

Road surfaces where water may collect can create conditions that cause a vehicle to hydroplane. Watch for clear reflections, tire splashes, and raindrops on the road. These are indications of standing water.

### 2.6.3 – Speed and Curves

Drivers must adjust their speed for curves in the road. If you take a curve too fast, 2 things can happen. The tires can lose their traction and continue straight ahead, so you skid off the road. Or, the tires may keep their traction and the vehicle rolls over.

Slow to a safe speed before you enter a curve. Braking in a curve is dangerous because it is easier to lock the wheels and cause a skid. Slow down as needed. Do not ever exceed the posted speed limit for the curve. Be in a gear that will let you accelerate slightly in the curve. This will help you keep control.

### 2.6.4 – Speed and Distance Ahead

You should always be able to stop within the distance you can see ahead. Fog, rain, or other conditions may require that you slow down to be able to stop in the distance you can see. At night, you cannot see as far with low beams as you can with high beams. Slow down when you must use low beams.

### 2.6.5 – Speed and Traffic Flow

When you are driving in heavy traffic, the safest speed is the speed of other vehicles. Vehicles going the same direction at the same speed are not likely to run into one another. In California, speed limits are lower for trucks and buses than for cars. It can vary as much as 15 mph. Use extra caution when you change lanes or pass on these roadways. Drive at the speed of the traffic, if you can without going at an illegal or unsafe speed. Keep a safe following distance.

The main reason drivers exceed speed limits is to save time. Anyone trying to drive faster than the speed of traffic will not be able to save much time. The risks involved are not worth it. If you go faster than the speed of other traffic, you will have to keep passing other vehicles. This increases the chance of an accident, and it is more tiring. Fatigue increases the chance of an accident. Going with the flow of traffic is safer and easier.

## 2.6.6 – Speed on Downgrades

Your vehicle’s speed will increase on downgrades because of gravity. Your most important objective is to select and maintain a speed that is not too fast for the:

- Total weight of the vehicle and cargo.
- Length of the grade.
- Steepness of the grade.
- Road conditions.
- Weather.

If a speed limit is posted, or there is a sign indicating “Maximum Safe Speed,” never exceed the speed shown. Also, look for and heed warning signs indicating the length and steepness of the grade. You must use the braking effect of the engine as the principal way of controlling your speed on downgrades. The braking effect of the engine is greatest when it is near the governed rpms and the transmission is in the lower gears. Save your brakes so you will be able to slow or stop as required by road and traffic conditions. Shift your transmission to a low gear before starting down the grade and use the proper braking techniques. Carefully read the information on going down long, steep downgrades safely in Subsections 2.16 Mountain Driving in this handbook.

## 2.6.7 – Roadway Work Zones

Speeding traffic is the number one cause of injury and death in roadway work zones. Observe the posted speed limits at all times when approaching and driving through a work zone. Watch your speedometer, and do not allow your speed to creep up as you drive through long sections of road construction. Decrease your speed for adverse weather or road conditions. Decrease your speed even further when a worker is close to the roadway.

## 2.6.8 – Overtaking or Following Another Vehicle

You may not overtake and pass another vehicle which is moving at less than 20 mph on a grade (outside a business or residential district) unless you can pass that vehicle at least 10 mph faster than it is traveling and the pass can be completed within 1/4 mile (CVC §21758). You must not follow the vehicles listed below any closer than 300 feet. The rule does not apply during overtaking and passing, when there are 2 or more lanes for traffic in each direction, or in a business or residential district (CVC §21704).

- A motor truck or truck tractor having 3 or more axles.
- Any motor truck or truck tractor towing any other vehicle.
- A passenger vehicle or bus towing any other vehicle.
- A school bus transporting any school pupil.
- A farm labor vehicle when transporting passengers.
- A vehicle transporting explosives.
- A trailer bus.

When large vehicles are being driven in caravan on the open highway, at least 100 feet must be left between them to allow other vehicles to overtake and pass them (CVC §21705).

## SUBSECTIONS 2.4, 2.5, AND 2.6

### Test Your Knowledge

1. How far ahead does the handbook say you should look?
2. What are two main things to look for ahead?
3. What’s your most important way to see the sides and rear of your vehicle?
4. What does “communicating” mean in safe driving?
5. Where should your reflectors be placed when stopped on a divided highway?
6. What 3 things add up to total stopping distance?
7. If you go twice as fast, will your stopping distance increase by 2 or 4 times?
8. Empty trucks have the best braking. True or False?
9. What is hydroplaning?
10. What is black ice?

These questions may be on the test. If you cannot answer them all, reread Subsections 2.4, 2.5, and 2.6.