

# SAFETY BRIEF

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## Triodyne Inc.

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## Tailgating - Rule of Three

By Ralph L. Barnett\*

### ABSTRACT

The safe following distance guidelines given in Illinois Rules of the Road are too complicated and/or unsafe. A safer guideline is proposed: measured in feet, the safe distance between vehicles is 3 times the speedometer reading. This is approximately the length of a fire truck (pumper) for every 10 mph.

### HISTORY

The 1961 Illinois Rules of the Road recommended a safe vehicle interval of one car length for every ten miles per hour of speed. This simple, easy to apply rule of thumb, did not specify a standard car length.

### 1961 Illinois Rules of the Road:

#### **DON'T FOLLOW TOO CLOSELY**

***You must maintain sufficient distance between your vehicle and the vehicle ahead of you so that you can stop in case of any emergency without colliding. Allow at least one car length for every ten miles per hour of speed. At 30 miles per hour keep at least three car lengths between you and the other vehicle ahead; at 40 miles per hour, four car lengths, etc. Keep as far behind as the pressure of traffic will allow. If you must follow closely take extra precaution in watching for trouble ahead.***

The "car length/10 mph" guideline alone was promulgated in Illinois until January, 1971 when Illinois added the "two-second" rule, i.e., the safe vehicle interval should not be less than the distance the "following vehicle" travels in two seconds. The complete reference follows,

### 1971 Illinois Rules of the Road:

#### **FOLLOWING TOO CLOSELY**

***Most rear end collisions are caused by following too closely. The law requires a driver to show due regard for the speed of the traffic and the condition of the highway, and to allow such space as may be considered reasonable and prudent. One car length for each 10 miles per hour is often used as a guide, on dry pavement when visibility is good. Another good method is to watch the car ahead of you when it passes some reference point, such as a telephone pole. Then count "one-thousand-one, one-thousand-two"...if you pass the same spot before you are through counting you are following too closely.***

In 1980, Illinois abandoned the "car length/10 mph" guideline completely and adopted the more conservative "two second rule." The rationale was explained in the 1980 Rules of the Road as follows:

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## 1980 Illinois Rules of the Road:

### VEHICLE INTERVAL

The space that is the easiest to control is the space ahead of your vehicle. This space cushion is called following distance. For many years the rule of thumb formula was to allow one car length for every ten miles per hour. The following chart illustrates why the two second rule is more readily adaptable for today's drivers and allows for a safer following distance.

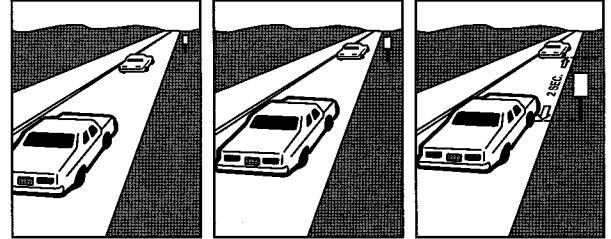
### RATIONALE FOR 2 SECONDS FOLLOWING DISTANCE

CAR SPEED	FT. CAR WILL TRAVEL IN 1 SECOND	AT 1 CAR LENGTH FOR EACH 10 MPH YOU WILL BE: (based on a 20 ft. vehicle)	2 SECOND SAFETY RULE YOU WILL BE
30 =	44.0	60 ft. back	88.0 ft. back
40 =	58.7	80 ft. back	117.4 ft. back
50 =	73.3	100 ft. back	146.6 ft. back
60 =	88.0	120 ft. back	176.0 ft. back

To use the two-second rule, choose a fixed object on the road ahead, such as a sign post, tree, over pass, bridge abutment, etc. When the vehicle ahead passes that object, begin to count, "One thousand one, one thousand two." If you reach the object before you finish saying "One thousand two," you are following too closely and should slow down.

The two-second procedure applies to any speed under good road and weather conditions. If road and weather conditions are not good, increase your following distance to a four or five second count.

a fixed object on the road ahead such as a sign, tree or overpass. When the vehicle ahead of you passes the object, count "one-thousand-one, one-thousand-two." You should not reach the object before you count to one-thousand-two. If you do, you are following too closely. Most rear end collisions are caused by the vehicle in back following too closely.



The two second rule also applies to your speed when you are on a good road and during good weather conditions. If the road and/or weather conditions are not good, increase your distance to a four or five-second count. If you are being tailgated, move to another lane or slowly pull off the road and allow the vehicle to pass.

Two-Second Rule		
Vehicle Speed	Approximate Feet Vehicle Will Travel in 1 Second	2 Second Rule Distance
25 m.p.h.	37 ft.	74 ft. back
35 m.p.h.	52 ft.	104 ft. back
45 m.p.h.	66 ft.	132 ft. back
55 m.p.h.	81 ft.	162 ft. back

It should be noted that application of the protocol provides no quantitative information concerning the vehicle interval.

A number of observations seem germane:

- The case against the "car length/10 mph" rule is especially poignant in the year 2002 where no cars may be found that approximate the 20 foot vehicle used in the 1980 table. Indeed, in 2002 there are ten large car models that average 17 feet in length; thirty-four midsize car models that average 16 feet in length; and fifty small car models that average 15 feet in length. The adoption of car lengths in the 15 to 17 foot range makes the 10 mph rule even less conservative and even more dangerous than the two second rule. Drivers who were *calculating* following distance by multiplying speed by 20 feet instead of *visualizing* "a car" would undoubtedly have more trouble multiplying the speedometer reading by a factor between 15 and 17 while driving.
- The Rules of the Road does not require a vehicle operator to compute the following interval associ-

In the year 2002, the Illinois Rules of the Road no longer mentions the "car length/10mph" guide. It recommends the two second rule to determine the safe following distance.

It is possible, although cumbersome, to calculate the safe interval. It is conceivable, although unlikely, that drivers would memorize the table associated with the two second following distance. Consequently, driver education courses teach the following measuring protocol:

## 2002 Illinois Rules of the Road:

### VEHICLE FOLLOWING DISTANCE

**TWO-SECOND RULE:** Following a vehicle too closely is called "tailgating." Use the two-second rule to determine a safe following distance. Select

ated with the two second rule. A measuring protocol is described which is taught in driver education programs in Illinois.

- The two second rule protocol anticipates that a fixed object be chosen when following a vehicle. This pivotal activity may not be possible when driving in middle lanes during rush hour or when lighting conditions are impoverished.
- The protocol must be repeated when it reveals excessive speed or following too closely.
- The 1980 Rules of the Road recognizes concentration as one of the most important elements of safe driving. Unfortunately, driving concentration is seriously compromised during the application of the two second rule protocol. A driver may be required to repeatedly identify fixed benchmarks, hold the speed constant during testing, count off two-second intervals, and make pass/fail judgments while maintaining a safe driving profile.

### RULE OF THREE

To quantify the safe following distance by the two second rule is too complicated and too distracting. We first convert mph into feet per second (fps) by multiplying by 5280 ft/mile and dividing by 3600 seconds per hour. This gives the distance traveled in one second at the speedometer value. When multiplied by two we obtain the two second rule, i.e.,

$$\begin{aligned} \text{Safe Vehicle Interval (Ft.)} &= \left( \frac{5280}{3600} \times 2 \right) \times \text{mph} \\ &= (2.9333) \times \text{mph} \end{aligned}$$

It is conservative to approximate the factor in parenthesis as three (3) which provides an additional safety factor of 2.27%; hence,

$$\text{Safe Following Distance (Ft.)} = 3 \times \text{mph}$$

To visualize this result, a driver can picture one fire truck (pumper) length for every 30 feet. Even easier, one can just picture one fire truck length for every 10 mph of speed (see Table I).

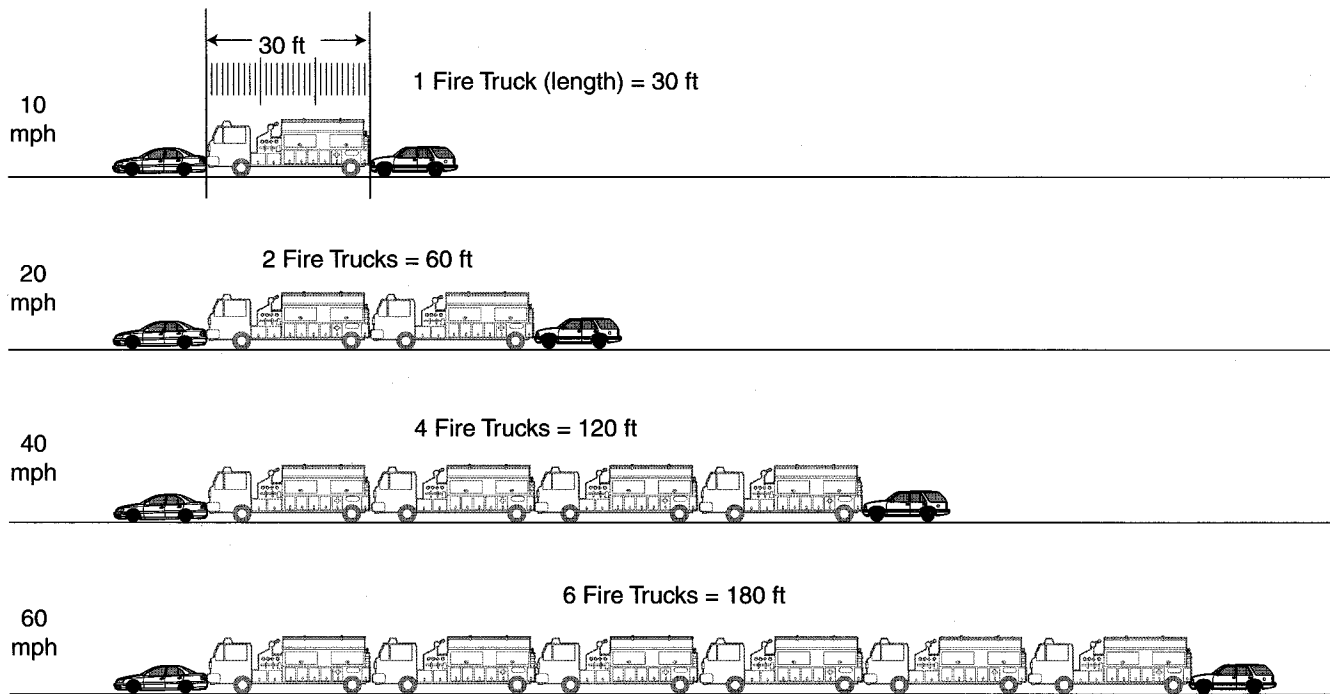
### CONCLUSIONS

1. Three times the speedometer reading gives an accurate and conservative estimate of the safe following distance in feet defined by the two second rule.
2. The standard pumper fire truck is 30 ft. long. It provides a reference dimension for drivers who need help estimating distance. One fire truck length for every 10 mph of speed gives the same spacing as the Rule of 3; see Fig. 1.
3. The “one car length/10 mph” rule of thumb leads to a vehicle interval that is approximately half of the safe following distance.
4. The two second rule protocol may lead to task overloading. Its safety consequences should be revisited.
5. Most states recommend the two second following distance rule.
6. A three second rule is suggested in California, Idaho, Missouri, Montana, and Virginia.

Table I - Following Distances

Car Speed (mph)	At One Car Length For Each 10 mph (based on 16 ft vehicle)	2-Second Safety Rule Following Distance	Rule of 3	At One Fire Truck (Pumper) Length For Each 10 mph
20	32 ft	58.7 ft	60 ft	60 ft
30	48 ft	88 ft	90 ft	90 ft
40	64 ft	117.3 ft	120 ft	120 ft
50	80 ft	146.7 ft	150 ft	150 ft
60	96 ft	176 ft	180 ft	180 ft
70	112 ft	205.3 ft	210 ft	210 ft

**Safe Following Distance = One Fire Truck (Pumper) Length (30 ft) Per 10 mph**



*Figure 1 - Safe Following Distance Using Fire Truck Lengths*

7. A four second rule is used for safe following distance in Connecticut, Pennsylvania, Vermont, Wisconsin, and Washington (at speeds higher than 30 mph, otherwise 2-3 seconds). At 55 mph, the four second rule provides a safe tailing distance of 323 ft; this is greater than the length of a football field.
8. A "three to four second" rule has been adopted in West Virginia for the proper following distance.
9. The two second rule or one car length per 10 mph is used in New Jersey, Oklahoma, and South Carolina.
10. A three second rule or one car length per 10 mph is recommended in Ohio. The difference between these two guidelines is enormous.
11. Mississippi suggests the one car length per 10 mph guideline.
12. Minnesota has no explicit tailgating rule. They state "... keep a safe distance."
13. The guideline in Nebraska is simply "...keep pace with other traffic."
14. The recommendation in Oregon is "...make sure you are a safe distance from the vehicle in front of you."

## **SAFETY BRIEF**

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