PUBLIC SAFETY

You Take Time To React

Your auto moves forward several dozen feet while you try to stop in an emergency. It continues going forward even while you move to step on the brakes.

By MARTHA G. MORROW

➤ THERE IS a danger zone in front of every moving automobile. It is the distance you travel between the time you spot danger and the instant your car actually stops.

As your reaction time becomes greater from fatigue, worry or eyestrain, the danger zone lengthens. As the speed at which you drive your car increases, the farther this zone of danger stretches out in front of you. Fog and snow, poor brakes and bad roads make it still longer.

This distance within which you cannot stop is surprisingly long. With average brakes, if you are traveling at only 20 miles an hour, you probably move over 50 feet even after you have spotted danger. If moving 40 miles an hour, you go about 165 feet before stopping. And if speeding along at 60 miles an hour, you will go forward over 335 feet before coming to a standstill.

When a driver sees a car about to cross his path or a child dart out into the street, he must react quickly to avoid an accident. It takes time for you to realize the danger and move to avoid it; time passes while you step on the brakes which slowly bring the car to a halt.

Time Lag Before Action

Three-quarters of a second usually passes, with the car at unchecked speed, between the time a driver spots danger and steps on the brake pedal. A car being driven ten miles an hour normally goes forward a minimum of 11 feet between the time a driver becomes aware of danger and steps on the brakes. One going 20 miles an hour usually moves forward 22 feet. A car driven 60 miles an hour goes 66 feet forward before the driver, spotting danger, reacts to put on the brakes.

You probably think you move rather quickly when alerted for danger—which is not always the case when you drive. The truth, however, may be otherwise. A simple little gadget which you can easily make at home shows how really slow you and your friends are in your reactions.

Called a gravity chronoscope, the device was designed by Dr. Harold Schlosberg, psychologist at Brown University, Providence, R. I. To measure your time, simply have a friend drop an object and see how far it falls before you can stop it.

The following table shows the time required for an object to fall different distances. The best object to drop is a yardstick. It will save trouble if you mark the stick off in time units so the reaction time can be read directly from it. Thus opposite the half-inch mark put .05 sec. Use the following table, copying the numbers so you can read upward from zero.

This table shows how far a free-falling object will drop during the first half second:

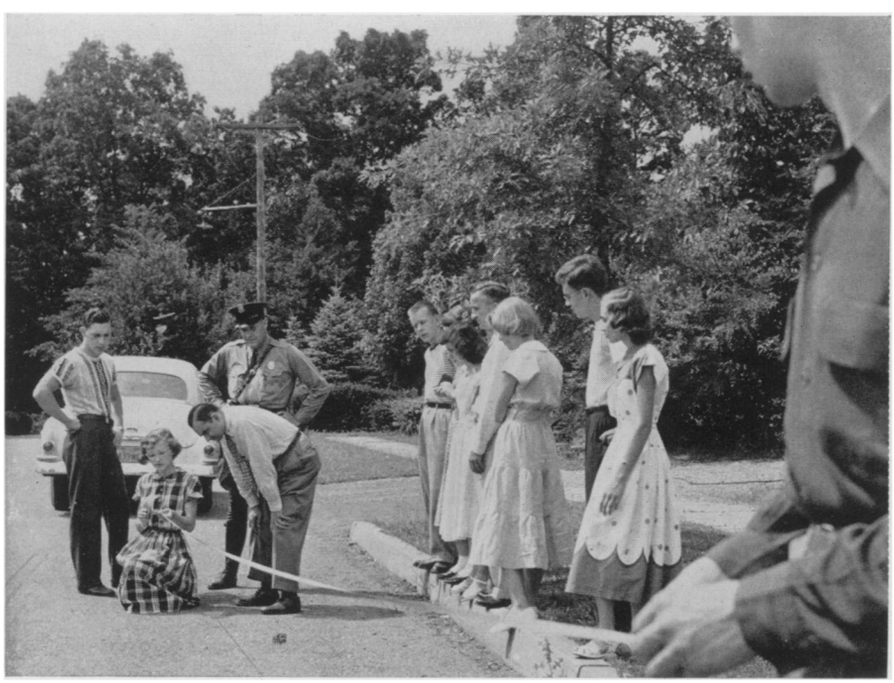
Seconds	*Inches*
Start	0
.05	1/2
.10	1 15/16
.15	4 5/16
.20	7 11/16
.25	12
.30	17 5/16
.35	23 1/2
.40	30 3/4
.45	38 7/8
.50	47 7/8

Use a doorframe so you will have a sort of track to guide the yardstick as it falls. Mark a short horizontal pencil line at eye level on the frame. This is your index line, the place where your friend should hold the bottom, zero point of the yardstick each time you perform the experiment.

Ask him to press the yardstick against the doorframe with his thumb, standing so you can hold your thumb just below the end of the stick, ready to stop it by pushing it against the wall. Watch the yardstick and try to stop it as soon as you see it move, but do not touch it until it is actually released. The index line will enable you to read your reaction time directly.

Have a competition to see which one of a group has the quickest reaction time. For this, it is fairest to average about ten readings for each as sometimes a person is caught napping on a single trial. Always make a sudden release movement, or your friends will soon learn to beat the game.

In these experiments you were on the lookout for the falling object or finger movement which released the yardstick, and you were set to make a single simple reaction. In driving, however, there are many distractions; it takes longer to size up the situation and make the proper one of several possible responses. You seldom immediately become aware of danger, and



QUICK-STOPPING TEST—High school students, under the direction of Pennsylvania State College scientists, measure accurately the reaction time and the stopping distance of a test car through the use of a detonator device. A blank cartridge fires a chalk mark on the street at the start of the test and at the time the brakes are applied, making it possible to measure the danger zone in front of the car.

when you do, your foot reaction is always slower than your hand reaction.

When you expect trouble, it may take you only 0.4 to 0.5 second to step on the brakes. When you are required to steer the car as well, your brake-reaction time increases to around 0.6 to 0.7 second. In actual driving on the road, your performance is even more complex and 1.5 seconds or more usually pass before you react, as shown by studies at the Yale Bureau of Highway traffic by Dr. T. W. Forbes. Failure to recognize potential hazards is an outstanding cause of accidents.

If you are a young and inexperienced driver, pay particular attention to your driving. Drivers under 25 years of age have more than their share of accidents, according to a number of studies of accident records by Dr. A. R. Lauer of Iowa State College and others. As a rule, drivers over 35 and under 60 years of age have fewer accidents. If you are over 60, you do not react as quickly as you used to and must exercise more caution in driving.

Not only does a car continue to go forward, however, while you move to step on the brakes but it takes time for the brake pedal to actuate the brakes, for the brakes to grip the wheels and for the wheels to stop rolling. The following experiment will give you a rough idea of how far forward even a slow-moving car goes between the time someone shouts "stop" and the instant the car comes to a standstill.

Drive your car on a private driveway where there is no other traffic. If you do not drive, measure someone else's stopping distance. Fill a small bag with sand or dirt, or use a bean bag, so it will stay where dropped. Ask a friend to hold the bag far out of the right window, and shout "stop" at the very instant he throws the bag down vertically.

Drive your car at ten miles an hour, and put on the brakes the instant your friend calls "stop." Measure the distance from the car window back to the bag and you will discover about how far the car went after the stop signal was given. Actually, the car moves a bit farther because the bag of sand, while falling, moved forward with the speed of the car.

A chart makes vivid the great distance covered in stopping after danger has been sighted. Designed by the American Automobile Association for an average reaction time of .75 second and relatively good brakes (50% efficient), the following shows total stopping distances for various speeds:

STOPPING DISTANCES

IF YOU GO THIS FAST		After seeing danger, you go this far before stepping on the brakes	After applying brakes, you go this much farther before the car stops	After spotting danger, you travel this far before stopping
Miles per hour	*Feet per second*	*Reaction-time distance (feet)*	*Braking distance (feet)*	*Total stopping distance (feet)*
10	14.7	11.0	7	18.0
15	22.0	16.5	15	31.5
20	29.3	22.0	27	49.0
25	36.7	27.5	42	69.5
30	44.0	33.0	60	93.0
35	51.3	38.5	82	120.5
40	58.7	44.0	107	151.0
45	66.0	49.5	135	184.5
50	73.3	55.0	167	222.0
55	80.7	60.5	202	262.5
60	88.0	66.0	241	307.0

People usually underestimate the braking distance of a car because they assume that if the speed is doubled, the braking will also be doubled. But braking distance increases as the square of the speed. So actually if you are going along at 20 miles an hour and can stop within 30 feet, then speed up to 40, your braking distance will be four times as great or 120 feet. If your speed is three times as great, or 60 miles an hour, your braking distance will be increased nine times to 270 feet.

Several very exact instruments for measuring actual stopping distances have been developed by the Traffic Engineering and Safety Department of the American Automobile Association. Designed to be suspended from the car, they ride about six inches above the ground. Blank cartridges force a piece of chalk onto the pavement, permanently marking the point where the signal to stop is given, the brakes applied and so on.

Gadgets for Indoor Use

Other gadgets, designed for indoor use, also give a pretty good indication of your driving ability. Some, using automobile parts, measure how well your eyes, hand and foot coordinate. Others present actual traffic hazards in miniature on a small-scale road and record how well you avoid them by indoor driving.

But even if you react promptly, the "grip" of your tires may not be too effective on the road surface. Or the weather may be working against you. Skid marks are mute witnesses to the distance a car slides on a wet pavement, mud or snow. Even at only 35 miles per hour a car will skid nearly a hundred feet on wet concrete. So watch your speed, the one factor over which you have greatest control.

Arrange Own Demonstration

Following the suggestions in this article, you can take the lead in arranging a safety demonstration in your community, perhaps in cooperation with your local newspaper.

A detonator for showing delayed stopping time can probably be borrowed from your local AAA Club, progressive truck fleet company, high school offering driving instruction or police department. Advance practice will help your program go off smoothly.

Select a straight stretch of road that can be blocked off easily by arrangement with and under direction of the local police. For participants in the test, pick a high school boy and girl who have recently learned to drive, several adults of varying temperament, a fleet or other professional driver, and one or two older people. To avoid embarrassment, however, be sure to explain in advance to the older volunteers that the test may show them a little slow in reacting.

Test reactions when alerted and when not primed for the "stop" signal to show how slow drivers often are in becoming aware of danger. Arrange for those watching the show to test their own stopping distances if they wish. The local fire department will probably be glad to wet the road for skidding demonstrations. Others also would undoubtedly like to cooperate in such a highway safety demonstration.

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ICHTHYOLOGY

Large Shark Caught 2,300 Miles From Sea

➤ A SIX-FOOT shark has been captured 2,300 miles from the ocean, in the Peruvian headwaters of the Amazon river, reports Dr. George S. Myers, ichthyologist of Stanford University, Calif.

Dr. Myers said he learned about the river-going shark from Senor Felipe Ancieta of the Peruvian fish and game department, who sent him a picture of the shark which was caught near Iquitos, 2,300 miles from the Atlantic Ocean. The shark belongs to the genus Carcharhinus, the ground sharks, Dr. Myers said.

While sharks are known to travel some distances up rivers, this is the first authentic record of a shark from so deep in the Amazon, Dr. Myers said. Several unverified reports had previously mentioned sharks as far up the river as Manaus, Brazil, 1,000 miles from the coast.

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