CHAPTER 6
PERFORMING BASIC VEHICLE MANEUVERS

6.1 STEERING, SIGNALING AND CHANGING LANES

6.2 MAKING TURNS AND TURNING THE VEHICLE AROUND

6.3 PARKING

CONTROLLING YOUR VEHICLE IS YOUR TOP PRIORITY

Steering Straight Backward

Backing your vehicle may feel strange at first. Steering when moving backward involves knowing where to look and how to control direction and speed. Before backing, make sure your rear zones are clear, and follow these steps:

1. Hold the brake pedal down and shift to REVERSE.
2. Turn your body to the right, and put your right arm over the back of the passenger seat. Look back through the rear window.
3. Put your left hand at the top of the steering wheel at the 12 o'clock position.
4. Release pressure on the brake just enough to allow the vehicle to creep backward slowly.
5. While looking back through the rear window, move the top of the steering wheel toward the direction you want the back of the vehicle to go.
6. Keep your foot over the brake pedal while your vehicle is moving backward. Glance quickly to the front and sides to check traffic. Continue to look back through the rear window as you brake to a stop.

The driver is in the correct position for backing straight.

Signaling

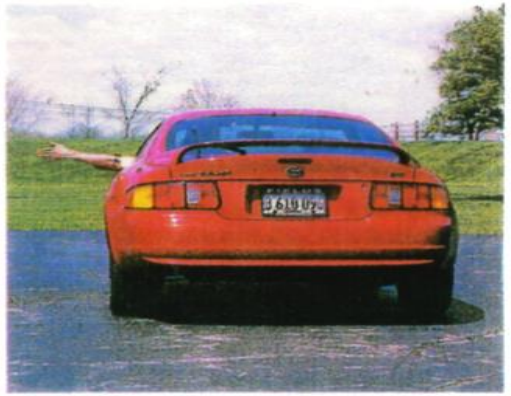
Develop the habit of signaling every time you plan to turn, change lanes, slow, or stop. Signal well in advance before you begin any maneuver. Doing so gives other drivers time to react.

Even though all vehicles have turn-signal devices, there will be times when you use hand signals for further protection. Hand signals are often easier to see in bright sunlight. If your turn-signal device does not work, use hand signals. Many times a combination of turn lights and hand signals will be more effective.

Notice the hand and arm positions in the pictures. The first picture shows the left arm and hand pointing up for a right turn. The second shows the left arm and hand extended straight out for a left turn. The third picture shows the left arm extended downward, indicating slow or stop.

When using hand signals, use your right hand to maintain steering control. Make all hand and arm signals well in advance of entering a turn. Return your left hand to the steering wheel before you begin to execute the turn.

Right turn



Left turn

Slow or stop

Changing Lanes

Drivers must be able to execute the lane-change maneuver smoothly and safely before they learn to pass other vehicles. Changing lanes is a maneuver you will use often on a roadway with two or more lanes of traffic moving in your direction. You also may need to change lanes before making right or left turns.

At times, changing lanes gives you a better position or view when driving in traffic. For example, you might change lanes when following a large truck on a multilane highway. By moving to a different lane, you increase your sight distance and get a broader view of the traffic scene.

Steering control is a critical factor as you learn the lane-changing maneuver. Oversteering can cause your vehicle to turn too sharply as you start to enter the adjoining lane. The first picture shows this oversteering error. At higher speeds you could lose steering control.

Change lanes as smoothly as possible. The second picture shows the safe path of travel of a vehicle executing a smooth lane change.

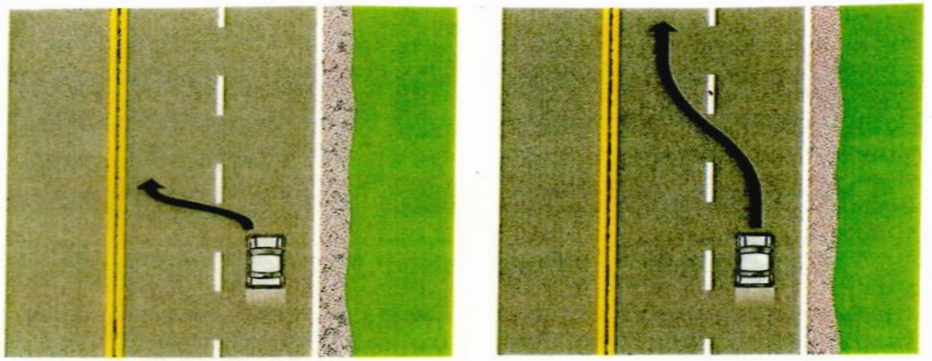
Always follow the same procedure for making a lane change, regardless of your reason for making the lane change. Before changing lanes, check all zones for possible hazards. Make sure you can see far ahead in the lane of your intended path of travel and that there are no obstructions in either lane.

Follow these steps when making a lane change to the left:

1. Check traffic in the front and left-front zones. Check rear zones through the rearview mirrors.
2. Signal and make a blind-spot check over your left shoulder to see if any vehicle is about to pass you.
3. Increase your speed slightly as you steer smoothly into the next lane if it is clear.
4. Cancel your signal and adjust your speed.

Follow the same procedure when making a lane change to the right, with one exception. After checking traffic ahead and through both mirrors, check the blind-spot area over your right shoulder. Take only a glance to make the check. Be careful not to pull the steering wheel to the right as you turn to glance over your right shoulder. Keep steering straight as you check your blind spot. If the lane is clear, complete the lane change to the right the same way you would make a lane change to the left.

Are you aware of the lane changing feature of the turn signal device?



Oversteering can cause you to take an incorrect path for changing lanes. The picture on the right shows the correct path of travel for a smooth lane change.

Driverless cars may be ready in 10 years

By TOM KRISHER
ASSOCIATED PRESS

Detroit, Mich. — Cars that drive themselves — even parking at their destination — could be ready for sale within a decade, General Motors Corp. executives say.

GM, parts suppliers, university engineers and other automakers all are working on vehicles that could revolutionize short- and long-distance travel.

At the Consumer Electronics Show in Las Vegas on Tuesday, GM Chief Executive Rick Wagoner will devote part of his speech to the driverless vehicles.

"This is not science fiction," Larry Burns, GM's vice president for research and development, said in an interview.

The most significant obstacles facing the vehicles could be human rather than technical: government regulation, liability laws, privacy concerns, and people's passion for the automobile and the control it gives them.

Much of the technology already exists for vehicles to take the wheel: radar-based cruise control, motion sensors, lane-change warning devices, electronic stability control and satellite-based digital mapping.

Automated vehicles could dramatically improve life on the road, reducing crashes and congestion.

If people are interested.

"Now the question is: What does society want to do with it?" Burns said. "You're looking at these issues of congestion, safety, energy and emissions. Technically there should be no reason why we can't transfer to a totally different world."

The first use probably would be on highways, where people would have the option to use a driverless mode. They would control the vehicle on local streets, Burns said.

Des Moines Register
January 7, 2008

Car Talk

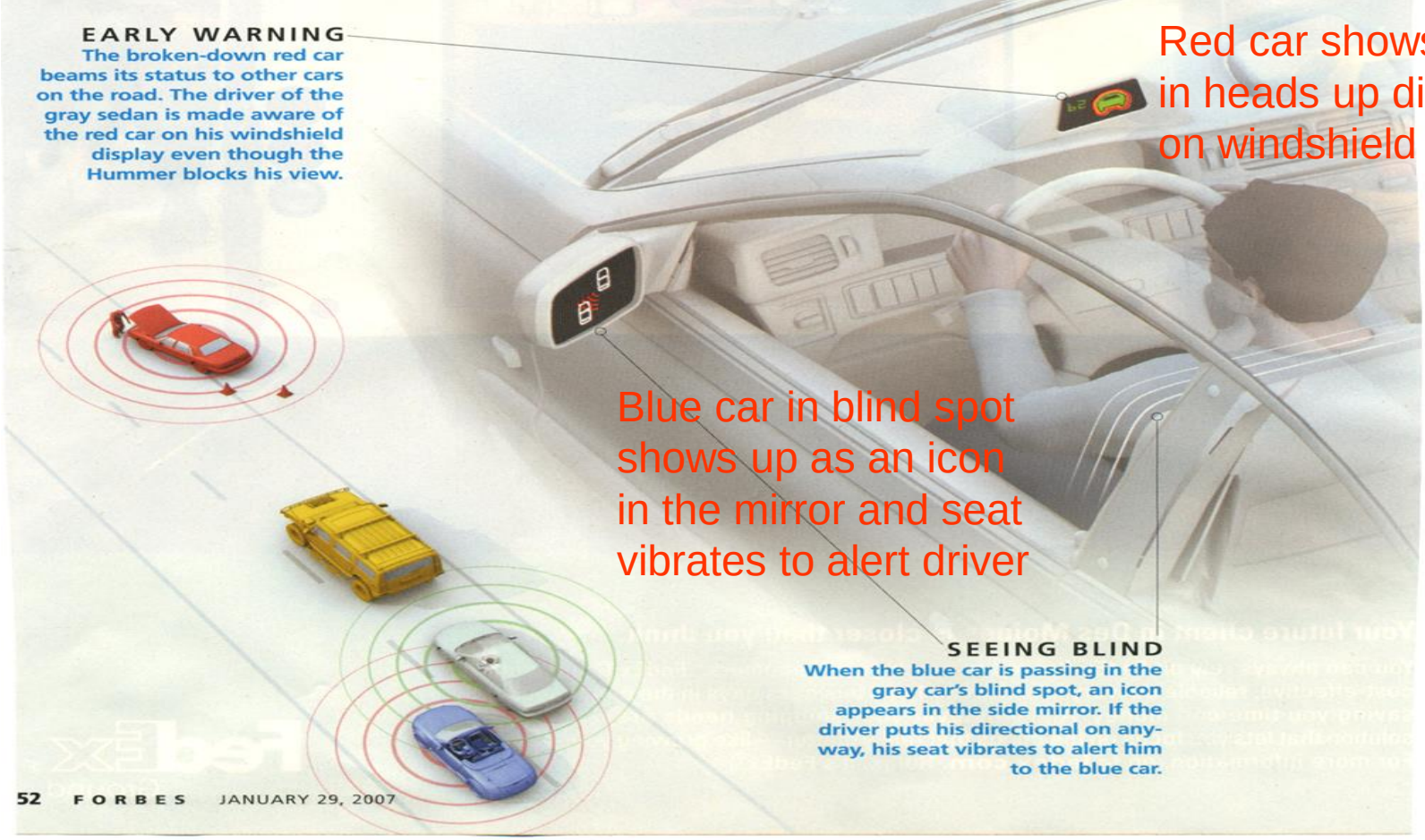
Cadillacs, Camrys and Accords will soon be chatting on the causeway. Will this keep them from crashing into one another? | By Jonathan Fahey

ON A GENERAL MOTORS TEST TRACK IN Warren, Mich. an engineer sitting in the passenger seat of a black Cadillac CTS gives a reporter the following instructions: Step on the gas and drive 30mph toward another CTS parked in the same lane. Don't touch the brakes.

Two car lengths before a nasty collision, and just before panic sets in, the two Caddies start talking to each other, sharing status reports over tiny radio chips in their trunks. The moving CTS realizes it has to brake, and does so all by itself.

These cars are test vehicles in General Motors' effort to develop vehicle-to-vehicle communications systems. Other automakers are developing similar systems in the hope that, starting five years from now, roads and highways will be information-rich networks, with cars knowing what other cars are doing and responding intelligently. "It opens up a whole new world for automotive safety," says GM's advanced-technology chief, Larry D. Burns. "A road where cars wouldn't potentially crash at all."

For $200 per vehicle—the cost of a Wi-Fi router, a microprocessor and a global po-



EARLY WARNING
The broken-down red car beams its status to other cars on the road. The driver of the gray sedan is made aware of the red car on his windshield display even though the Hummer blocks his view.

SEEING BLIND
When the blue car is passing in the gray car's blind spot, an icon appears in the side mirror. If the driver puts his directional on anyway, his seat vibrates to alert him to the blue car.

Hand-Over-Hand Steering

You use **hand-over-hand steering** by pulling the steering wheel down with one hand while your other hand crosses over to pull the wheel farther down. The pictures match these steps for correct hand-over-hand steering for a left turn:

1. Begin the turn from a balanced hand position.
2. Start pulling down to the left with your left hand. Your right hand pushes the wheel toward the left about a quarter turn.
3. Release your left hand from the wheel and cross it over your right hand to grasp the wheel near the top. Continue pulling down.

You can complete the turn by continuing to pull down with the left hand as you release the right hand.

Some steering wheels will straighten after a turn if you relax your grip. However, be ready to unwind the wheel hand-over-hand, especially at lower speeds, with front-wheel drive vehicles, and when backing.

Push-Pull Steering

Some drivers prefer **push-pull steering** for some maneuvers. This method allows you to keep both hands on the wheel at all times.

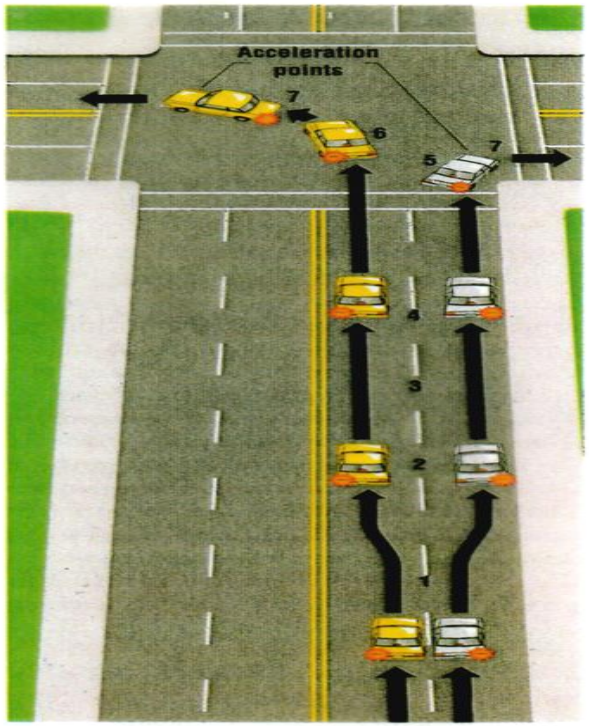
To use this method, one hand grasps the steering wheel near the 4 or 8 o'clock position. That hand then pushes the wheel up to near the 12 o'clock position. At the same time, the other hand slides up to the 11 or 1 o'clock position and pulls down. As the pulling hand comes down, the pushing hand returns to the original position to continue the process. With this method, you never cross your arms while driving.

Making Left and Right Turns

Make left and right turns only after checking all traffic. Take these precautions when executing turns:

- Look for pedestrians and oncoming vehicles. Check rear zones for vehicles about to pass you.
- Plan turns well in advance. Be in the correct lane about a block before your turn.
- Obey all traffic signs, signals, and roadway markings. Remember that you must yield to oncoming traffic when preparing to turn left.

When turning in a stickshift vehicle, you might need to downshift before entering a sharp turn. Downshift and release the clutch before the turn so you have both hands free for turning.



Steps for making left turns (yellow car) and right turns (white car)

Procedures for Turning The numbers in the picture on the left match the following steps for turns:

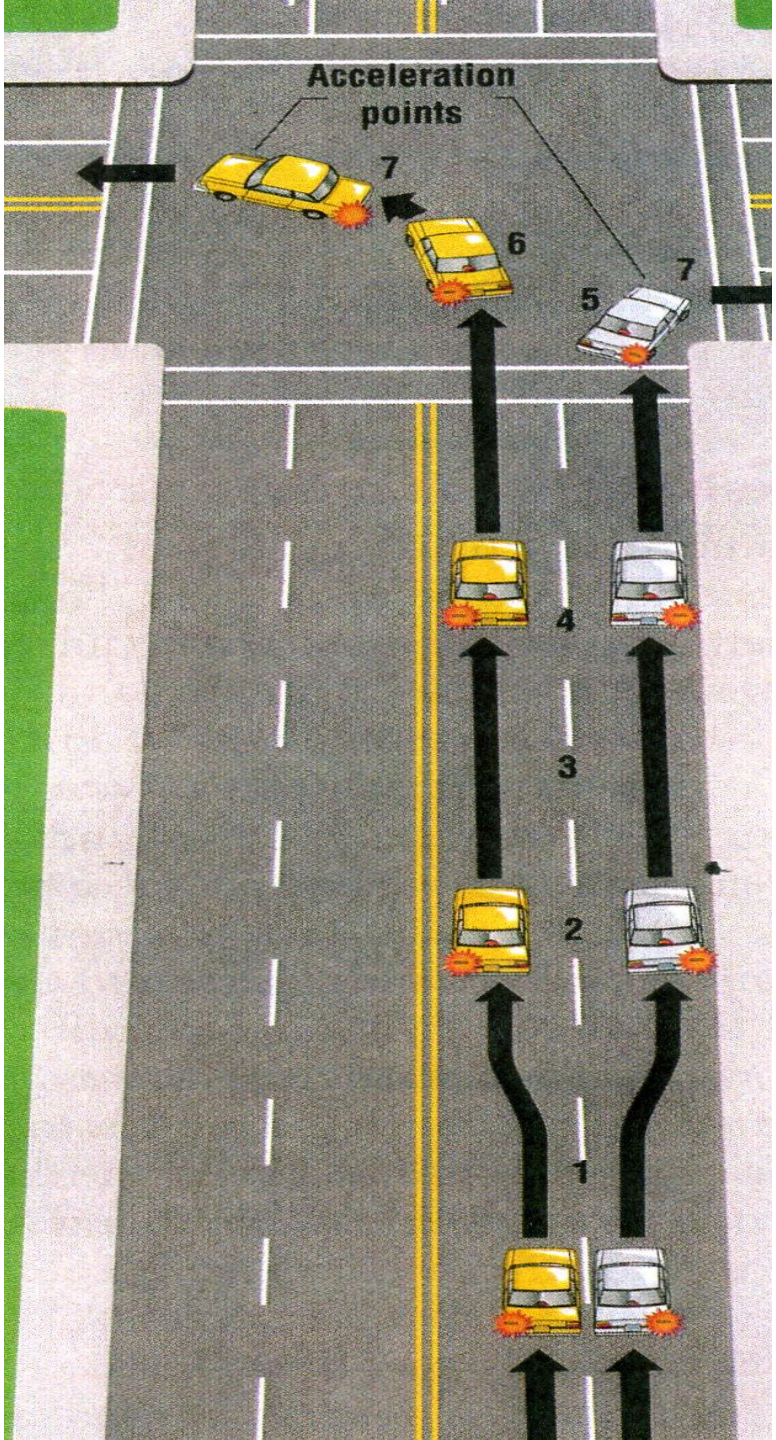
1. Position your vehicle in the correct lane for the turn. For a right turn, be in lane position 3 if there are no parked vehicles. For a left turn, be in the lane nearest the center line in lane position 2. (On a one-way street, be in the far left lane.) Signal about half a block before the turn.
2. Brake early to reduce speed.
3. Use your visual search pattern to check the front zones for vehicles, pedestrians, and bicyclists.
4. Slow to about 10 mph just before the crosswalk.
5. For a right turn, check to the left again before turning. Then look in the direction of the turn. Begin turning the wheel when your vehicle's front bumper is even with the curbline.
6. For a left turn, check traffic to the left, then right, then left again. Turn the steering wheel just before the front of your vehicle reaches the center of the intersection. Continue looking left into the lane you will enter.
7. As you begin your turn, make a quick blind-spot check through the right side window. Check front and rear zones. If the intersection is clear, turn into the nearest lane of traffic going in your direction. Accelerate about halfway through the turn as you return the wheel to the straight-ahead position.

Shared Left-Turn Lane

Some left turns into business areas can be made in midblock from a center lane. This is called a **shared left-turn lane.**

This type of left turn can be hazardous. Before making a turn from a shared left-turn lane, search your front zones. Follow the proper procedure to enter the center lane. Look ahead for oncoming traffic and be prepared to yield to any vehicle whose path you will cross.

A shared left-turn lane

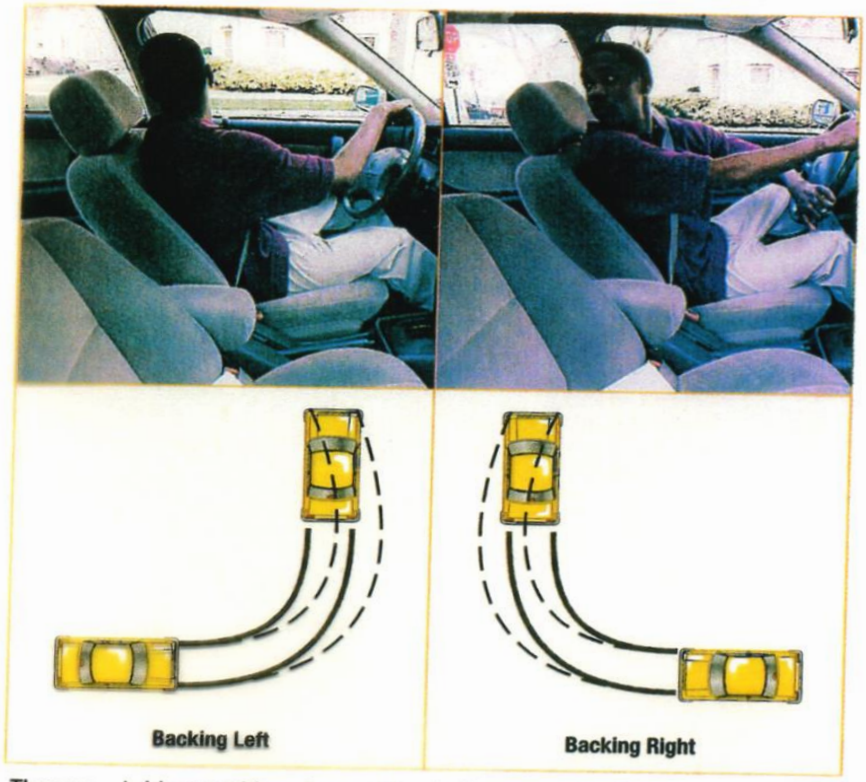

Acceleration points
7
6
5
7
4
3
2
1

Backing Left and Right

When backing to the left, your visual search will be primarily over your left shoulder through the left side windows. When backing right, you will look over your right shoulder and through the right side windows. Use hand-over-hand steering and follow these steps to make sharp turns when backing.

1. Before backing, check for traffic, pedestrians, parked vehicles, and any stationary objects in front, around, and behind you. Turn your head toward the direction you will be backing.
2. Keep both hands on the wheel, ready for hand-over-hand steering. Pull the wheel to the left to back left. Pull the wheel to the right to back right. The back of your vehicle will go in the direction you turn the wheel. Look back toward the direction you want the vehicle to go.
3. Back slowly as you enter the turn. Make quick glances to the front and sides to be sure no one is near. Begin to unwind the steering wheel to finish the turn in a straight position.

When backing left, allow a wide space on the right side. The front wheels will move far to the right of the rear wheels. The front of your vehicle will swing wide to the right. When backing right, allow a wide space on the left side.



The correct driver positions for backing to the left and to the right, and the space and path of travel the car takes during backing

This same outward movement of the vehicle occurs when driving forward and turning. It must be factored into your parking calculations

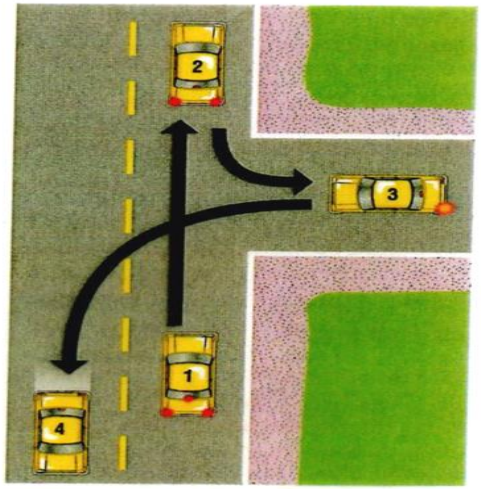
Turning the Vehicle Around

A **turnabout** is a maneuver for turning your vehicle around to go in the opposite direction. Because turnabouts often require drivers to cross or back into traffic, they should be considered a high-risk maneuver.

Take these precautions when you plan to make a turnabout:

- Be sure local laws permit the turnabout.
- Select a site with at least 500 feet of visibility in each direction.
- Do not make a turnabout near hills or curves or within 200 feet of intersections.
- Never attempt a turnabout in heavy or high-speed traffic.
- Check continually in all zones for traffic and pedestrians.

You must decide which of the five turnabouts described is best for each situation. The steps for each turnabout match the numbered car locations shown in the pictures.



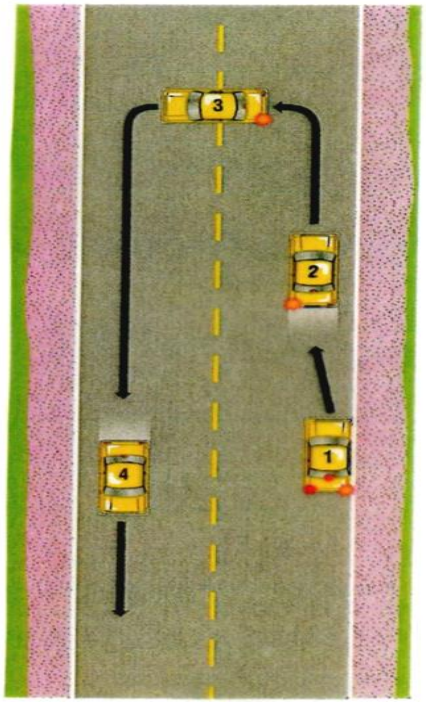
Back into driveway on right side

Back into Driveway on Right Side Choose this turnabout if a clear driveway is on the right and there is no close traffic in your rear zones. This turnabout has the advantage of letting you reenter traffic going forward.

1. Check traffic to the rear. Begin to slow as you proceed beyond the driveway.
2. Stop about three feet from the curb and with your rear bumper just beyond the driveway. Check traffic, and back slowly to the right to location 3. Use hand-over-hand steering. Stop when your vehicle is completely off the street.
3. Signal a left turn. Check traffic.
4. When your path is clear, drive forward to location 4.

Safest

Dangerous



Midblock U-turn

Midblock U-turn Make sure local and state laws permit this type of turnabout. You need a wide space to make a U-turn. A U-turn is risky because you must cross several lanes of traffic to execute it.

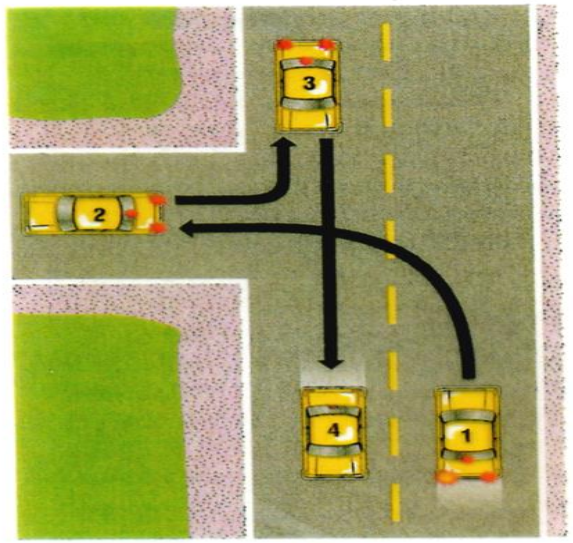
1. Check traffic ahead and to the rear, and then signal right. Pull to the far right and stop at location 1.
2. Signal left and move toward location 2.
3. Check your front and left-rear zones. Check your left blind spot. Turn sharply left while moving slowly toward location 3. Do not stop if you have enough space to complete the turn.
4. Move slowly toward location 4. Check all zones. Straighten the wheels while you accelerate gently into the proper lane.

This maneuver is dangerous because you are crossways in a traffic lane. Make this turnabout as a last resort and KNOW WHERE YOU ARE

Next safest

Pull into Driveway on Left Side
You might choose this turnabout if oncoming traffic is light and a driveway on the left is available. The disadvantage is that you must back into traffic before moving forward.

1. Check traffic in front and rear zones. Signal a left turn and use the left-turn procedure to move to location 2. Stay as close to the right side as possible. Stop with your wheels straight when your vehicle is completely off the street.
2. Check traffic again, especially from the right. Back slowly to the right to location 3. Look to the right rear and side while backing. Stop with the wheels straight.
3. Accelerate gently, scanning all zones, as you drive forward toward location 4.

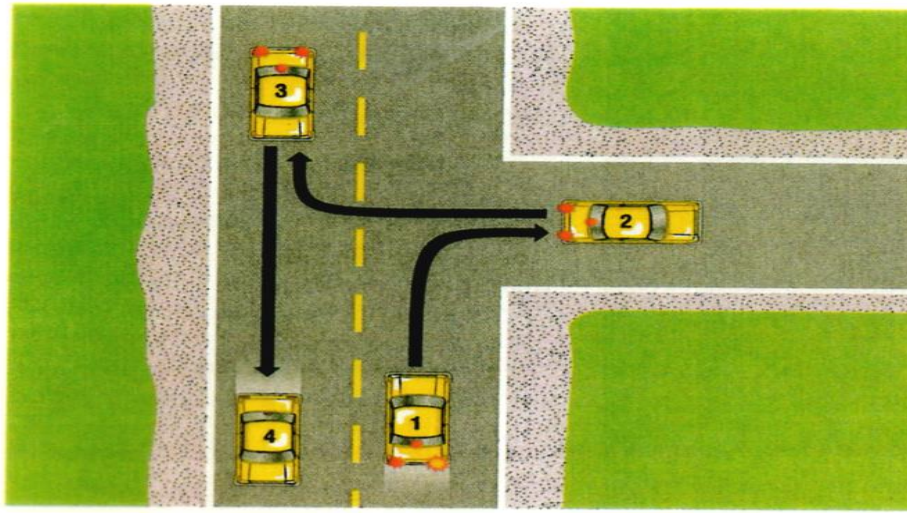


Pull into driveway on left side

Pull into Driveway on Right Side
This type of turnabout is a high-risk maneuver. To complete it, you must back across two lanes of traffic and into oncoming traffic before moving forward. Avoid this turnabout whenever possible.

1. Check traffic in front and rear zones. Signal a right turn and use the right-turn procedure to move to location 2. Stop when your vehicle is off the street.
2. Check traffic again from both directions. Back slowly across the street, turning left toward location 3. Look to the left, rear, and side when backing. Glance to the front, then continue looking back while stopping with the wheels straight in location 3.
3. Accelerate gently, and drive forward to location 4.

Least safe



Pull into driveway on right side

Three-point turnabout

Three-Point Turnabout This turnabout is hazardous to perform. You not only cross traffic lanes, but your vehicle is stopped across a traffic lane. Executing this maneuver may put you in a high-risk situation.

1. From location 1 check front and rear zones. Signal right and stop close to the curb as shown in location 2. Check traffic ahead, to the rear, and over your left shoulder. Signal a left turn.
2. Search front and rear zones as you turn sharply left. Move to location 3 with wheels straight. Stop before hitting the curb.
3. Check all traffic again. Turn the wheels sharply right while backing slowly to location 4. Back only as far as necessary to complete the maneuver and before hitting the curb. Stop with wheels straight.
4. Check traffic again and signal left. Move slowly forward while steering left toward location 5.

As with the mid block u-turn, this 3 point turnabout is very dangerous. Make the three point turnabout as a last resort and KNOW WHERE YOU ARE

Deciding Which Turnabout to Use

Consider these factors when deciding which turnabout to use:

- legality of the turnabout
- amount of traffic
- types of driveways available
- need to enter traffic lanes forward or backward
- ample space to enter traffic
- number of traffic lanes to cross

Backing into a driveway or alley on the right side is usually the safest type of turnabout to use because you can enter traffic forward.

Sometimes you might need to make a turnabout in light traffic. If there are driveways on both the left and right sides, choose the left driveway to turn into. This turnabout lets you back into your own lane rather than across both lanes. Select a gap in traffic that gives you ample time to complete the maneuver.

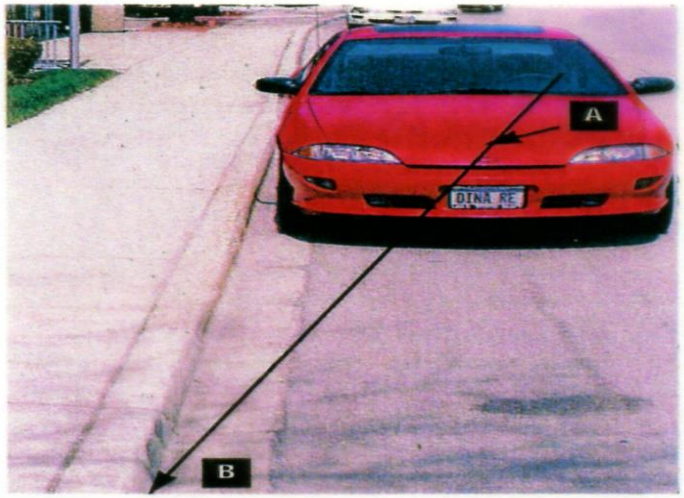
A three-point turnabout should rarely be used. Use this turnabout only when you are on a dead-end street or on a rural roadway with no driveways.

6.3 Parking

Some drivers find parking a vehicle a difficult maneuver to execute, because the size of the parking space often is limited. Parking your vehicle requires speed control, steering control, and accurate judgment.

Parking is easier and safer if you consider these factors:

- Try to find a parking space with ample room for entering and exiting easily. The size of your vehicle is the main factor in determining the space you choose.
- Avoid spaces at the end of parking lanes and near a large vehicle that might block your view. In end spaces your vehicle has a greater chance of being struck by other moving vehicles.
- Avoid spaces with a poorly parked vehicle on either side.
- Use reference points when executing parking maneuvers.



To use a standard reference point, the driver's line of sight sees the center of the hood at Arrow A and the curb at Arrow B. This tells the driver that the right tires are close to the curb.

Reference Points

Many drivers use reference points to serve as guides in determining the position of the vehicle in the roadway. A **reference point** is some part of the outside or inside of the vehicle, as viewed from the driver's seat, that relates to some part of the roadway. Reference points can be developed for the front, side, or rear to help you know where your vehicle is located in the roadway. A **standard reference point** is the point on the vehicle that is typical for most drivers. This could be a sideview mirror, a hood ornament, or the center of the hood. The photograph shows how the center of the hood is used for a standard reference point.

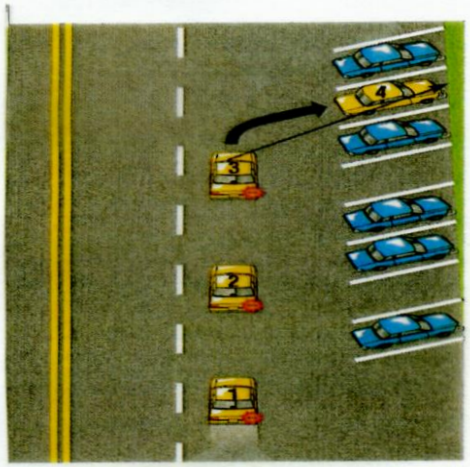
Once you learn standard reference points, you can develop your own **personal reference points.** A personal reference point is an adaptation of a standard reference point for one's own vehicle. You will learn to use different parts of your own vehicle such as wiper blades, door handles, or rearview mirrors as guides.

As you begin to practice parking maneuvers, you will learn which parts of your vehicle to use as personal reference points. You will be able to line up these points with parts of other vehicles to help execute the maneuvers.

Angle Parking

Use **angle parking** to park your vehicle diagonally to the curb. Angle parking is often used in parking lots and shopping centers.

1. Check for traffic and pedestrians. Position your vehicle at least six feet from the row of parked vehicles. Signal a right turn, check traffic to the rear, and begin braking.
2. Flash your brake lights to warn drivers behind. Check your right blind spot and continue braking.
3. Creep forward until you can see the center of the space without your line of sight cutting across the parking line. This is your reference point to begin turning. Turn the wheels sharply to the right. Slowly enter the stall.
4. Straighten the wheels when you are centered in the space. Determine your forward reference point to place the front of the bumper even with the curb or parking line.



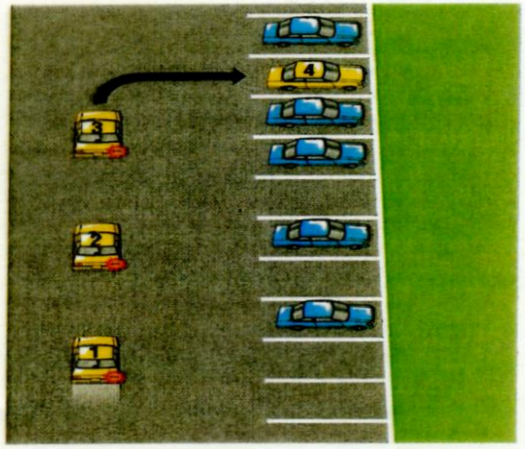
Angle parking

Perpendicular Parking

Use **perpendicular parking** to park your vehicle at a right angle to the curb.

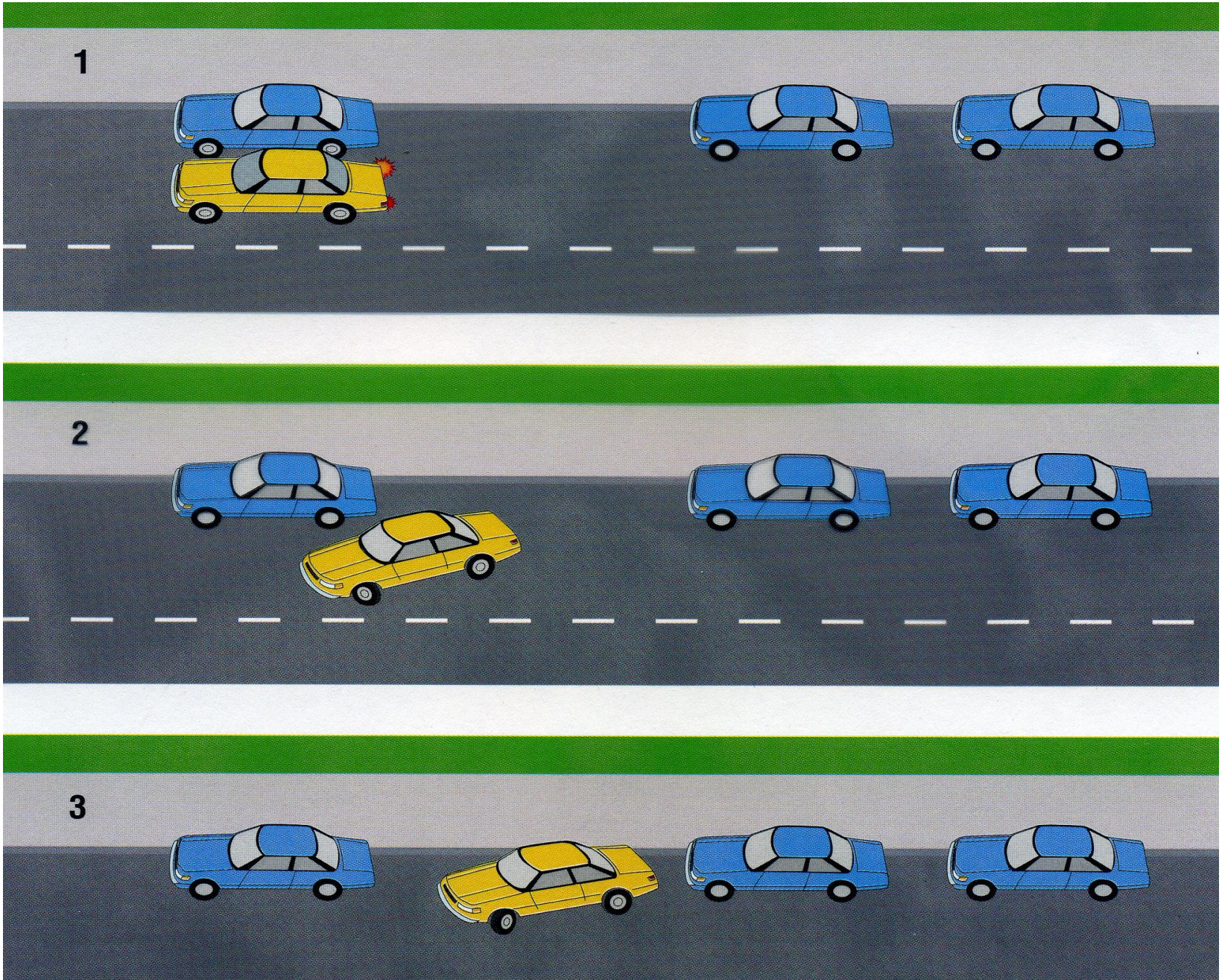
1. Position your vehicle at least eight feet from the row of parked vehicles, or as far to the left of the lane as possible. Flash your brake lights and signal a right turn. Check your right blind spot, and begin to brake.
2. Check traffic to the rear, and continue braking.
3. Determine your personal reference point to know when the front bumper of your vehicle passes the left rear taillight of the vehicle to the right of the empty parking space. Turn the wheel sharply right. Slowly enter the stall. Check your right-rear fender for clearance.
4. Straighten the wheels when you are centered in the space. Use a forward reference point, like the driver's side-view mirror, to stop before the wheels strike the curb.

Some drivers prefer backing into a perpendicular parking space. These drivers consider this a safer maneuver because they do not back out into traffic when leaving the space.

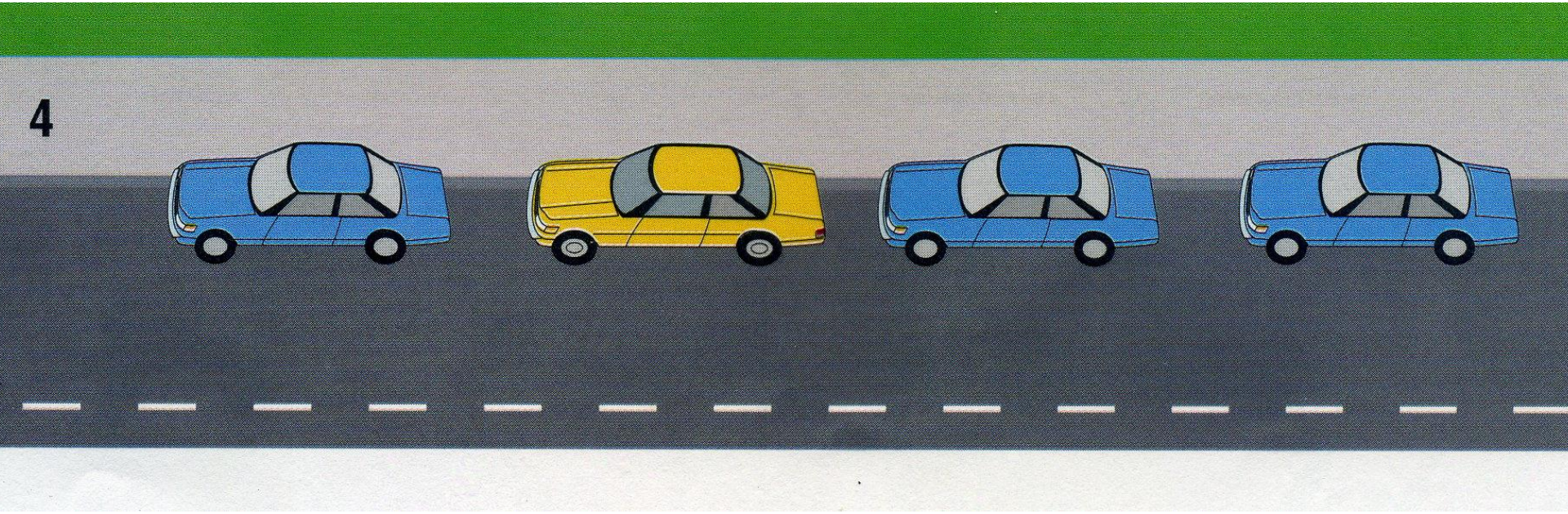


Perpendicular parking

PARALLEL PARKING



PARALLEL PARKING CONTINUED



HERE ARE THREE SHORT VIDEOS THAT DEMONSTRATE SEVERAL PARKING TECHNIQUES YOU MAY NOT HAVE SEEN BEFORE


W636 XPU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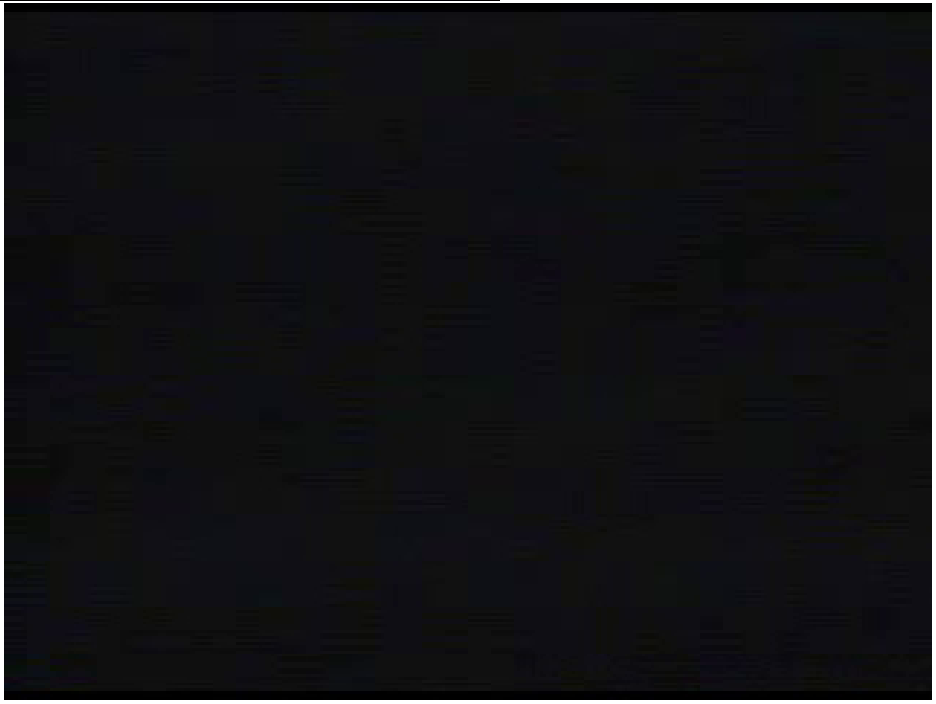


Parking on Hills

When parallel parking on a hill, you must be sure your vehicle will not roll down into traffic. Always turn the front wheels and set the parking brake to prevent the vehicle from rolling downhill. Procedures for uphill and downhill parking apply to parking on the right side of the street or roadway. Adjust your actions and visual checks when parking on the left side.

Uphill Parking with a Curb

1. Using personal reference points, position your vehicle close to the curb. Just before stopping, turn the steering wheel sharply left as shown in the first picture [illegible].
2. Shift to NEUTRAL. Let the vehicle creep back slowly until the back of the right-front tire gently touches the curb.
3. Shift to PARK (FIRST in a stick-shift), and set the parking brake.
4. When leaving the parking space, signal, check traffic, and accelerate gently into the lane of traffic.

Uphill Parking with No Curb

1. Pull as far off the roadway as possible. Just before you stop, turn the steering wheel sharply right, as in the second picture.
2. Shift to PARK (FIRST in a stick-shift), and set the parking brake.
3. When leaving the parking space, let the vehicle creep backward while straightening the wheels. Signal and check traffic. Shift to DRIVE (FIRST in a stickshift), and accelerate gently into traffic.

Downhill Parking with a Curb

1. Position your vehicle close to the curb and stop.
2. Let the vehicle creep forward slowly while turning the steering wheel sharply right, as in the third picture. Let the right-front tire rest gently against the curb.
3. Shift to PARK (REVERSE in a stick-shift), and set the parking brake.
4. When leaving the parking space, check traffic and back a short distance while straightening the wheels. Signal and check traffic again. Shift to DRIVE (FIRST in a stickshift), and accelerate into traffic.

Downhill Parking with No Curb

Follow the same procedure as downhill parking with a curb. Turn wheels sharply right as you creep as near to the shoulder as possible. Note this position in the fourth picture. Use the same steps for parking downhill with a curb to complete the maneuver and to leave the parking space.

When you leave any hilly parking space, make sure you have a big enough gap to enter traffic safely. Traffic coming down the hill may be approaching faster than you think it is.

Starting on a Hill

At times, you might have to stop while going up a hill. You must then be able to start moving forward again *without rolling back*. Starting on an uphill grade without rolling back involves timing and coordination.

WITH A CURB

The curb acts as a chock for the wheels to hold the car

The wheels are to be touching the curb

NO CURB

The wheels are turned toward the side of the road either up hill or down hill to keep the car from entering the roadway if the parking brake fails.

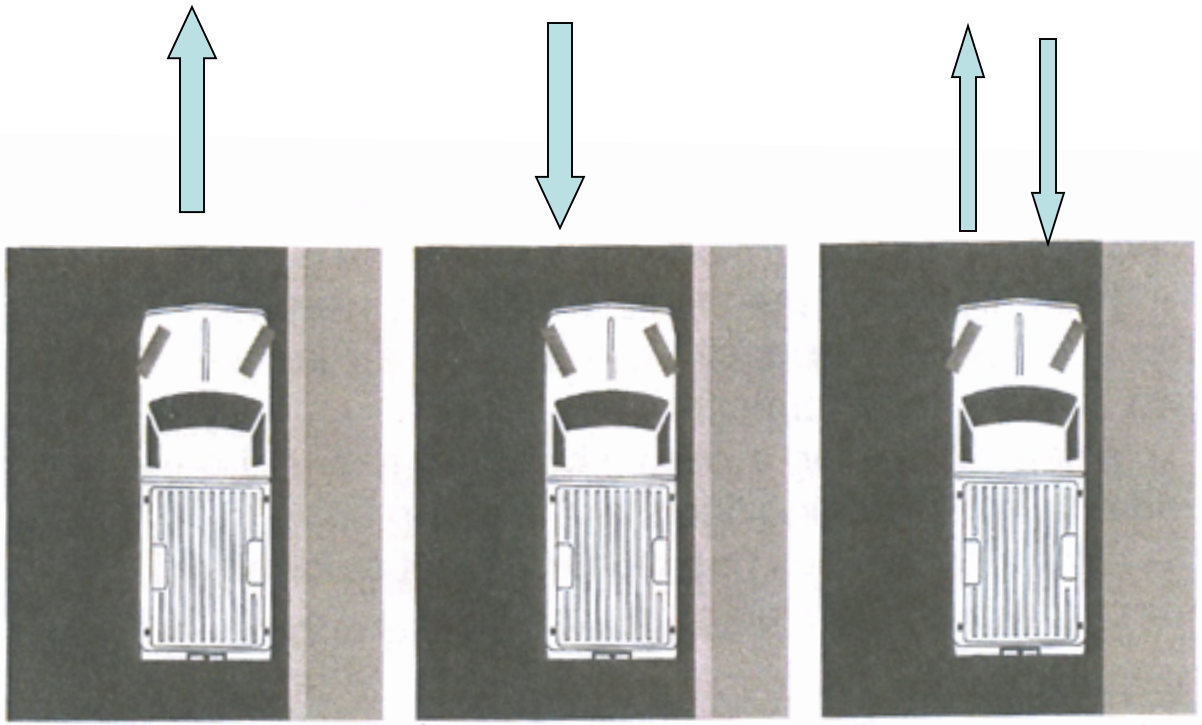
Uphill parking with curb

Uphill parking with no curb

The wheels are to be touching the curb

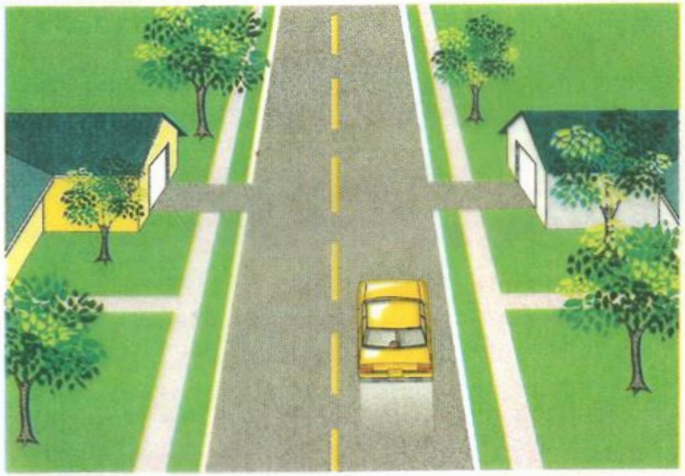
Downhill parking with curb

Downhill parking with no curb

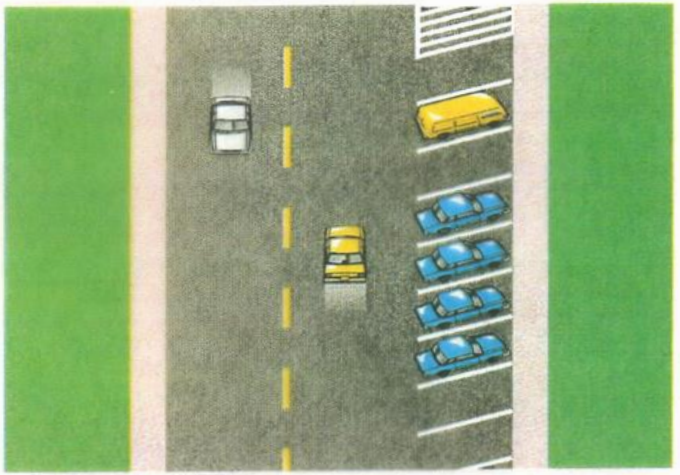


The object of turning the wheels toward or away from the curb is to get gravity to work for you in holding your car

Decision Making



1. You are the driver in this picture and need to make a turnabout. What type of turnabout would you choose? Why would you choose this type?



2. The driver of the yellow car in the picture plans to park in the row of angle-parked vehicles. Which parking space should the driver choose to use? Why is this space the safest?

3. What procedure must the driver of the blue car follow when leaving the parallel parking space? If there is a collision, who is at fault? Why?

4. Which direction should the front wheels be turned for the vehicles parked uphill? for the vehicles parked downhill? Why is this important?