



chapter 16

DRIVING ON HIGHWAYS

- 16.1 Classification of Highways
- 16.2 Entering Controlled-Access Highways
- 16.3 Strategies for Driving on Highways
- 16.4 Exiting Controlled-Access Highways
- 16.5 Highway Problems and Features

KEY IDEA

How can you manage risk when entering, driving on, and exiting multi-lane highways?



YOU'RE THE DRIVER

The skills necessary for low-risk driving on multi-lane highways are different from those you need for driving in city or rural traffic. Do you know the best way to merge with traffic? Do you know what to do if a vehicle is following too closely?

Lesson 16.1

CLASSIFICATION OF HIGHWAYS

OBJECTIVES

Identify the difference between highways that are fully-controlled access and those that are non-controlled access.

Describe the three kinds of highways that are found in each state.

Identify four different types of highway classifications.

KEY VOCABULARY

Controlled access
Grade
Elevation
Non-controlled access

The United States has 46,726 miles of highways that are part of the Interstate Highway System.

Even though highway driving is actually safer than driving on city streets or rural roads, it is more stressful on drivers because traffic moves much faster. To be a low-risk driver on highways, you need to learn skills that keep you safe as you enter, drive on, and exit highways. Safe driving demands that you manage visibility, time, and space expertly.

Three Classifications of Highway Systems

In the United States, there are three classifications of highways: the Interstate Highway System, the U.S. Highway System, and the State Highway System. Some states also have county highways, which have the same characteristics as state highways.

Names and design features for highways vary. For example, sometimes freeways are called expressways, or expressways are called freeways, though they have different design features.



Interstate Highway System The greatest system of controlled-access freeways is the Interstate Highway System. The design features of the Interstate System require every access to be a fully **controlled access**, which means that vehicles can enter and leave only at designated interchanges. **Interchanges** are places where drivers can cross over or under traffic as well as enter or leave the freeway.

There is a uniform standard for signs for interstates. The Interstate highway sign is a red, white, and blue shield, as shown in **FIGURE 2**.

Freeways are major multi-lane divided highways designed for high speeds. They have at least two travel lanes going in opposite direction with adequate shoulders. Traffic is separated by **grade elevation**, which means that bridges and tunnels are used to direct traffic over or under other travel lanes.

Without traffic lights or STOP signs, the freeway is able to accommodate a larger volume of traffic and reduce the potential for high-speed rear-end crashes.

Freeways can have tolls. The word *free* in freeway refers to the fact that traffic can flow freely without traffic lights.

Expressways Other controlled-access highways that have similar characteristics as freeways are turnpikes, parkways, super-highways, and expressways. The difference in the characteristics of freeways and expressways, as defined by the federal government, is that an expressway may have **non-controlled access** rather than fully-controlled access. This means that expressways could have traffic lights, intersections, and driveways where traffic is able to enter or leave the expressway.

Traffic entering or exiting at slower speeds than the traffic flow creates a dangerous situation, especially for distracted drivers. If you look to your target area and predict that there could be a traffic light, or a vehicle entering from a side road, you will have ample time to adjust your speed and control the traffic to the rear. If you are distracted and suddenly confronted with stopped traffic ahead, you would be at great risk of rear-ending the vehicle ahead or of being rear-ended by others.

Turnpikes and Parkways Turnpikes and freeways are very similar in design features. *Turnpike* was used to designate a toll road. However, many

FIGURE 2



The even numbered routes run east and west with the lowest numbered routes beginning in the south.



The odd numbered routes go north and south with the lowest numbers beginning on the west coast.



Parkways may have rest areas, commercial buildings, stores or offices. Signs are prohibited.

of the highways classified as turnpikes no longer charge tolls, or have been absorbed into the Interstate highway system.

Parkways were some of the earliest controlled-access highways. Commercial traffic and billboards are prohibited on parkways. Because many parkways have a STOP sign at the end of the entrance ramp and no acceleration lane, a driver may have to accelerate from a full stop directly into a travel lane of the parkway. Some parkways may have traffic lights to accommodate crossing traffic, which can create a dangerous situation for parkway drivers who do not search to the target area. However, some of the most scenic highways in the United States are parkways.

U.S. Highways The U.S. highway system was the first highway network that connected states. Most of the state highways and U.S. highways have non-controlled access, which allows drivers to enter and leave the highway from any point. There are intersections with traffic controls to separate crossing traffic, which makes traveling slower and more dangerous than being on a controlled-access freeway.

State Highways The state highway system is a network of highways existing within the boundaries of a state. Many of these highways are narrow two-lane roadways in rural areas. However, some state highways may be expressways and others may be controlled-access freeways.

Freeway Interchanges

The four most common types of freeway interchanges are cloverleaf, diamond, trumpet and all-directional interchanges. The names of the interchanges are based on their shapes.



FIGURE 4 A cloverleaf interchange has a series of entrance and exit ramps that resemble the outline of a four-leaf clover. This type of interchange enables drivers to proceed in either direction on either highway.



FIGURE 5 A diamond interchange is used when a road that crosses a busy highway has little traffic.



FIGURE 6 A trumpet interchange is used where one highway forms a T-intersection with a freeway.



FIGURE 7 An all-directional interchange is used in complicated intersections with high-volume traffic. From this interchange, traffic is channeled in many different directions.

view it 16.1

Explain why knowing the difference between a fully-controlled access highway and a non-controlled access highway helps to make you a low-risk driver.

Explain the differences between interstate, U.S., and state highways, and their numbering systems.

Explain how each type of interchange helps to keep traffic moving.

Critical Thinking

Transfer How does understanding the numbering system on route markers help you to be a safe driver?

5. Reasoning Do you think parkways require greater attention to the driving task than driving on a freeway? Explain your reasoning.

IN THE PASSENGER SEAT

Cause and Effect As a passenger on any highway of the interstate highway system, list some of the advantages of the highway that you notice compared to local streets and roads. Then explain the effect the advantage has for drivers. For example, you might list that the curves are gradual and banked, which means you can drive at higher speeds without loss of traction.



lesson 16.2

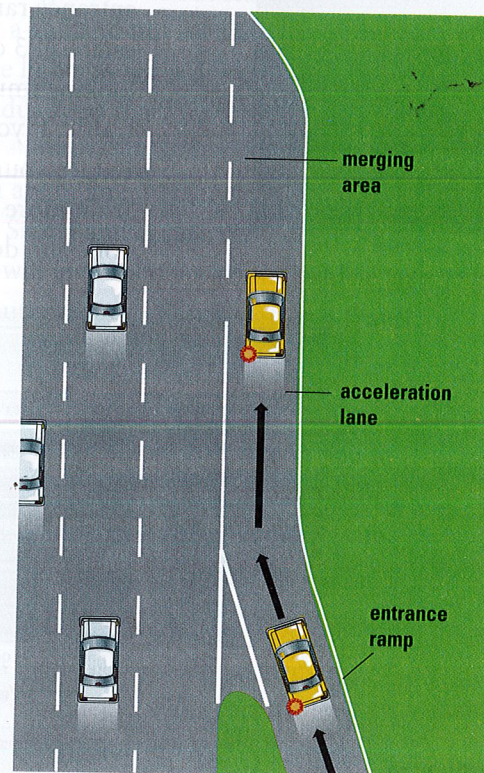
ENTERING CONTROLLED-ACCESS HIGHWAYS

Any plans for driving on any controlled-access highway should include a travel plan, regardless of the length of the trip. For short trips, know the name, route, or number for both the entrance and exit you will use. For long-distance trips, plan stops for food, fuel, and rest.

Controlled-Access Entrances

Before you enter any highway, make sure you are using the correct entrance ramp. Many drivers have mistakenly tried to enter a freeway by using an exit ramp. To help prevent this error, red and white signs are posted saying WRONG WAY OR DO NOT ENTER.

There are three parts to a controlled-access entrance, as shown in **FIGURE 8**. The **entrance ramp** provides access to the highway and the opportunity to search for a merge area. Many drivers make the mistake of driving too quickly on the entrance ramp. Driving more slowly provides time to evaluate zone conditions and to select a gap in the traffic flow, which allows you to slip into the gap or hole without causing drivers behind you to brake. If you do an adequate search while you are on the entrance ramp, you will be able to predict between which vehicles you should merge. You can then accelerate so that you will be at the same speed as the traffic flow when your merge area is next to you.



OBJECTIVES

- Explain what actions you should take on the entrance ramp, the acceleration lane, and the merge area.
- Describe four possible entrance problems.
- Explain the importance of a proper speed selection while on the entrance ramp.



VOCABULARY

- entrance ramp
- acceleration lane
- merging area
- hole in traffic
- ramp meter

FIGURE 8 CONTROLLED-ACCESS ENTRANCE

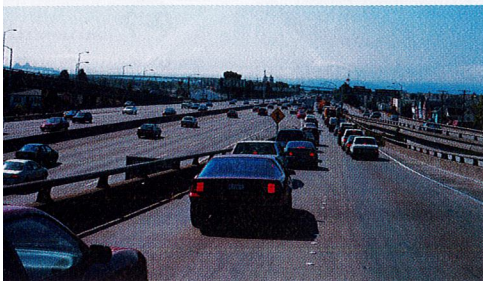
The **acceleration lane** provides an area where you can speed up in order to match the speed of the traffic flow you're entering.

The **merging area** is the space in a travel lane of the highway that is parallel to the acceleration lane, where you will be joining the traffic flow.

Entrance Problems

Entrances to controlled-access highways require special attention because they have the highest risk for crashes. **FIGURE 10** shows the number of deaths as a result of drivers who mistakenly entered an exit ramp. Short entrance ramps, short acceleration lanes, and high dividing walls contribute to entrance problems.

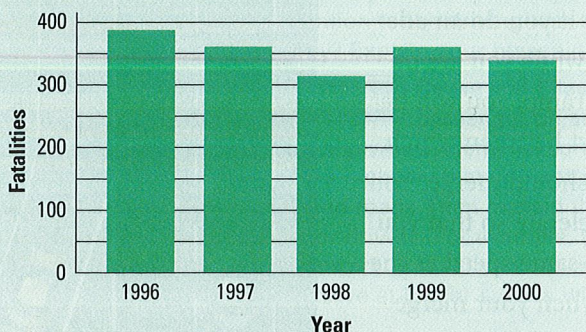
ance ramps have high walls blocking ch makes it more difficult to see the gap accelerate to the proper speed. Using the error can give you a view of approaching



The Entrance Ramp If you make an error and enter the wrong entrance ramp, continue onto the highway and drive to the next exit. **Never back up on an entrance ramp or on a freeway.**

When other vehicles are on the entrance ramp, adjust your speed to establish 3 or more seconds of space. Begin looking immediately for a gap or hole in traffic. If you have a closed front zone, reduce your speed to give the vehicle in front more time to enter. Check your rear zone and do not slow down or stop suddenly.

Wrong-Way Fatalities



Source: Fatal Accident Reporting System, National Highway Traffic Safety Administration

FIGURE 10

The more space you have from the vehicle in front of you, the better opportunity you will have to accelerate into a safe merge area.

When the entrance ramp and acceleration lane are short, it can be difficult to time entry into a merge area. When you are on the entrance ramp, check the outside mirror and look to the left for a merge area.

Where there is no acceleration lane, find a **hole in traffic**—an empty space between traffic clusters—for a point of entry. This will give you enough space to get on the highway from a stopped position without causing another car to brake.

Some entrance ramps have a **ramp meter**, which is a set of traffic signals—red and green only—to control traffic flow onto the highway.

Acceleration Lane During rush hours, the number of vehicles entering the freeway will alter the speed and space you need to enter. If entrances have very short acceleration lanes, slow down to provide the best opportunity to merge. Otherwise, you will be forced to reduce your speed or come to a stop while on the acceleration lane, which creates a highly dangerous situation.

Make every effort to enter a highway without stopping. A driver behind you might be looking for a gap and not see that you are stopped. If you must stop, flash your brake lights to warn drivers behind you and try to reduce your speed gradually so that you'll be able to accelerate when you get a gap.

If you run out of room, you are in an emergency situation. Wait for a large, safe gap or hole. Signal and accelerate quickly while staying in lane position 3, which will give an approaching vehicle an opportunity to pass by you without incident. **Never stop in a travel lane of the highway!**

Merging Problems Adjusting your speed is critical to timing a smooth entrance into traffic. A closed front zone may cause you to reduce your speed and select a new gap. Accelerate to reach traffic speed. Check your rear zone and establish lane position and a safe following distance.

Left-Entrance Ramp Some entrance ramps are located on the left of the highway, which creates a high-risk situation. Checking fast-moving traffic over your right shoulder can be more difficult than checking to your left. Use your right-outside mirror before

FIGURE 11

At a ramp meter, you must wait for the green light before entering the highway. Even with the green light you are still responsible for performing a safe merge.



FIGURE 12

Entering a freeway from the left can be more difficult than entering from the right. The acceleration lane merges into the far-left lane of traffic. Since this lane is usually used for high-speed traffic, the potential for conflict is greater than when you enter from the right.



making a blind-spot check. You might have difficulty seeing a motorcyclist or a very small car. Signal early as you look for a gap. When you see a gap, accelerate, and merge into the traffic lane.

Steps for Entering

Before you begin entering a highway, make sure the entrance is the one you want and that there are no red and white WRONG WAY OR DO NOT ENTER signs, as shown in **FIGURE 13**. Look for a ramp meter and be prepared to stop if it is red.

Once on the entrance ramp, take these steps:

1. Check your front and rear zones. Do not accelerate until you are in the acceleration lane and have selected a gap or hole.
2. When your vehicle is at a 45-degree angle to the highway, signal, and make quick glances through your left outside rearview mirror and over your left shoulder to find a gap in traffic. While looking in your left-outside mirror, move your head about 8 inches forward and slightly away from the mirror to get a better view of traffic.
3. Once you are in the acceleration lane, decide between which vehicles you will enter. Increase your speed to time a smooth merge.
4. As you enter the merging area, adjust your speed to match the traffic flow.
5. Once on the highway, cancel your signal and adjust to the speed of traffic.
6. Position your vehicle with 3 or more seconds of following distance.

view it 16.2

Describe the actions that help you merge smoothly while in the acceleration lane.

Describe a situation on an entrance ramp that might prevent you from safely merging.

Why is the correct speed important on the entrance ramp?

Why is it important to look for a hole in traffic?

Critical Thinking

Analyze What special problems does an entrance ramp with a line-of-sight restriction present for drivers?

6. **Compare and Contrast** Compare your actions when entering a highway that doesn't have an acceleration lane with a highway that does have one.

IN YOUR COMMUNITY

Research Visit your local fire department or police station and find out how many crashes that were reported took place on or near entrance ramps. Then find out how many crashes at entrance ramps happened across your state. Find out the time of the crash, the type of highway, and the type of ramp. Make a graph comparing the data. Share your graph with the class.



lesson 16.3

STRATEGIES FOR DRIVING ON HIGHWAYS

Once you are on the highway, stay alert as you adjust to the constantly changing traffic scene. Search to your target area to use the IPDE Process and Zone Control System to manage space.

Applying the IPDE Process and Zone Control

Highway driving makes using the IPDE Process and Zone Control easier than driving on two-lane roads because there are more opportunities to search farther ahead and there are fewer variations of highway designs to change your intended path of travel.

Identify Interstate highways are designed to give drivers a long sight distance. However, higher speeds and multiple lanes require you to get the visual information farther ahead. You also need to identify closed front zones early. Never allow yourself to become trapped between two large vehicles.

Be aware of distracted drivers who may be talking on cellular phones or reading a map. Always take the best lane position and maintain proper following distance in order to stay clear of those drivers.

Predict A predictable traffic flow is a safety feature of highways. However, you must search ahead to your target area to watch for slower traffic or for drivers changing lanes. Anticipate closed zones and points of conflict at entrances. In construction areas, predict that traffic will move slowly or stop.

Decide The driving speeds on highways demand that you make quicker decisions. Last-second decisions and driving adjustments can quickly change your safe path of travel into a dangerous one, and may close one or more zones. Interchanges, in particular, create potential-collision areas because of the various speeds of drivers who are entering and exiting the highway.



OBJECTIVES

- Explain how to apply the IPDE Process on the Interstate Highway System.
- Explain the advantages of a 3 or more second following distance.

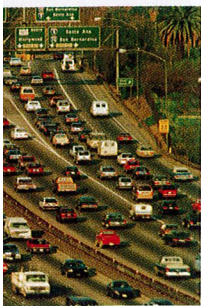


VOCABULARY

- reversible lane
- high-occupancy toll (HOT) lane
- common speed

4 on high-density traffic such as this is because of the issues drivers face regarding visibility, and time.

How can you improve visibility, space, and driving on highways?



Execute Execute your decisions smoothly. Signal early for every maneuver and maintain 3 or more seconds of following distance. When passing, or when a vehicle is passing you, use a lane position that will give you the greatest amount of separation space. This will provide an escape path for vehicles, if needed, and minimize the road spray splashed on your windshield during wet road conditions. It will also decrease the wind buffet caused by passing trucks.

Lane Choice

Generally, it is safer to drive in the right lane and pass on the left. Reserve the center and left lanes for drivers who are passing and for faster traffic.

When traffic is heavy in the right lane, especially at entrance ramps during rush hour, use the center or left lane to avoid conflicts in the far right lane. Large trucks and vehicles towing trailers are restricted from using the left lane on many interstate highways. Avoid driving between two large vehicles.

Part of your decision of lane choice is based on information from signs, signals, and roadway markings. You are better able to maintain a safe path of travel and avoid sudden last-second decisions if you know your destination, read signs and roadway markings, and think ahead to your target area.

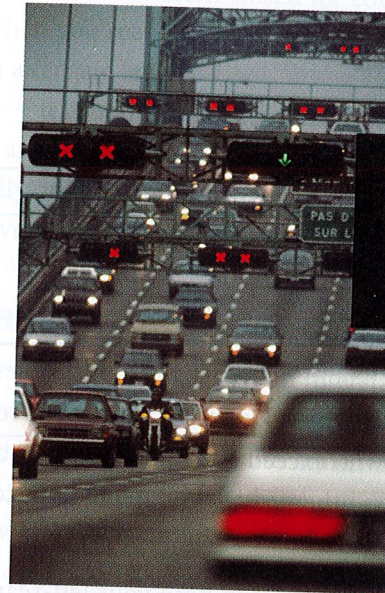
Often, several overhead signs are posted at the same place. Scan the signs quickly to get the information you need to continue in a safe path. An overhead sign with a yellow panel indicates the exit lane. All traffic in this lane must exit.

Reversible Lanes Traffic lanes where traffic can travel in either direction depending on certain conditions are called **reversible lanes**. These lanes are often used during commuter hours where traffic in and out of a city is heaviest. By using reversible lanes, traffic authorities can make most efficient use of traffic lanes.

While reversible lanes are good for opening more lanes to traffic, they can also be deadly. Distracted drivers account for many head-on crashes, so to help to eliminate them, some reversible lanes use retractable cones, vertical yellow markers, or a movable physical concrete to create a barrier when certain lanes are closed. Some highways use overhead signal lights, as shown in **FIGURE 15**, to indicate when it's safe to use a reversible lane.

FIGURE 15

Overhead signal lights use an arrow or an X to indicate open and closed lanes.



A green arrow means that the lane is open for traffic.

A yellow X warns you that the lane will be closing and you must prepare to move into another lane.

A red X indicates that the lane is closed.

Many highways have High-Occupancy Vehicle (HOV) lanes for buses and vehicles that have two or more occupants. Some highways have **high-occupancy toll (HOT) lanes**, which allow drivers to pay a fee in order to drive in an HOV lane with only one person in the vehicle.

Speed Limits The posted speed limit sign indicates the maximum speed the driver of a passenger vehicle may travel under ideal weather and traffic conditions.

The minimum speed limit is the lowest legal speed you can drive under ideal conditions.

Driving too slowly can be very dangerous in fast-moving traffic and can cause rear-end collisions. Use the far right lane when you are driving at or under the minimum speed limit.

When you drive in areas with no posted speed limit, follow the last sign you saw. Always drive at the speed that is safe and prudent for the weather and roadway conditions.

If you drive at the **common speed**, the speed used by most drivers, you can better blend with traffic. Sometimes the common speed is above

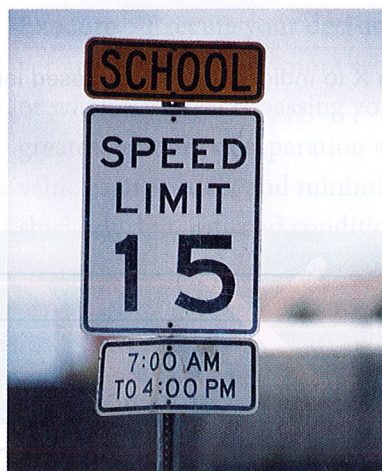


FIGURE 16 Some signs post special speed limits for different times of day and type of vehicle.

the maximum speed limit. Resist the temptation to increase your speed to keep up with the faster vehicles. Drivers who exceed the common speed are likely to weave in and out of traffic to pass other vehicles and are dangerous to other drivers.

Blind Spots Remember that you have blind spots in both your left-rear and right-rear zones. Check these zones often and be alert for other drivers who may pass you. Avoid driving in anyone's blind spots, especially truck drivers' blind spots.

Tailgating Vehicles that follow you too closely, or tailgate, can put you in a dangerous situation. To stay safe, encourage tailgaters to pass you by reducing your speed gradually. However, do not reduce your speed if heavy traffic prevents tailgaters from passing.

If a driver continues to tailgate, change lanes when it is safe to do so. Frequently check your rear zones to keep awareness of any tailgaters.

Changing Lanes

Avoid changing lanes too often. Unnecessary weaving from one lane to another can lead to a collision.

Changing lanes on a highway is more complicated when three or more lanes of traffic are moving in the same direction. Potential conflicts are created when two drivers head for the same space at the same time from opposite sides after passing a vehicle, as shown in **FIGURE 17**.

Remember that some highways have entrance ramps on the left as well as on the right. If you are driving in the left lane while approaching a left

entrance, check your right-rear zone to see if you will have an open zone to move into.

Lanes are often closed for construction and road repair. When you see in your target area that a lane is closed, check to find an alternate lane.

It is both illegal and hazardous to use the shoulder or median as a driving lane when traffic is backed up. Drivers who drive illegally on the shoulder are also preventing emergency vehicles from having an open path of travel.

Passing and Being Passed

Passing other vehicles on an interstate is usually safer than passing on a two-lane highway because the traffic you are passing is going in the same direction. With a median separating you from oncoming traffic on an interstate, a head-on collision is not a threat. However, highway speeds and a high volume of traffic demand concentration along with the use of the IPDE Process and Zone Control System when passing.

Before you pass, evaluate the zone you are entering, and signal your lane change. Be sure to check the blind-spot area to the left or right as necessary.

Passing on the left is best; however, passing on the right is permitted in some states. Passing on the right is dangerous because it is less expected, and drivers' peripheral vision is less effective than their central vision. When passing another vehicle, use the procedure for making a lane change to the left. After passing, return to your original lane.

When you are being passed, be aware of the position of the vehicle that is passing you. If the vehicle is too close to your side, move to lane position 2 or 3 to gain better separation. Continue to check the position of the vehicle passing you. If you want the vehicle to pass you more quickly, reduce your speed. Never increase speed while being passed.

Interstate highways provide the safest roadways per miles of driving. However, due to the high speed limits, they also account for the greatest number of fatalities per crash. Although highways are safer than other roadways, tired drivers, stalled vehicles, construction workers, and aggressive drivers combine to present hazards and potential conflict.

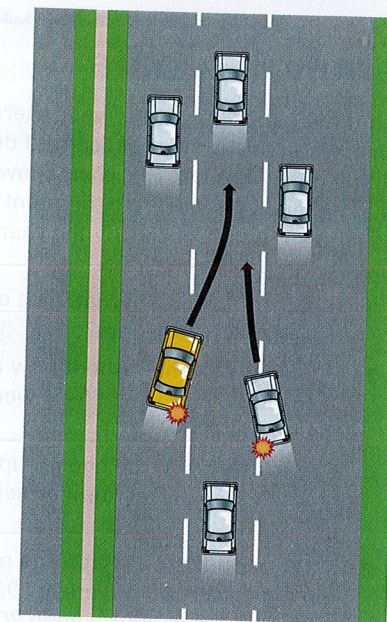
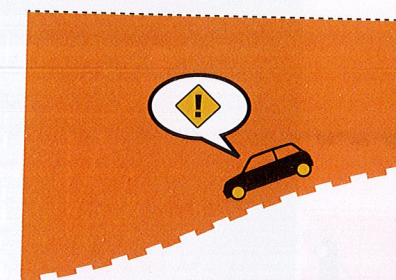


FIGURE 17 Conflict can occur when two drivers head for the same space at the same time.



safe driving tip

Passed Again If you are continually being passed on the right, it may mean that you are driving too slowly and that you should move to the lane on your right when it is safe to do so.

Analyzing data

Drivers Every year, there are changes in the number of licensed drivers in different age groups. This chart shows how many drivers there were of different ages in 1996, 2001, and 2006. Study the chart before answering these questions.

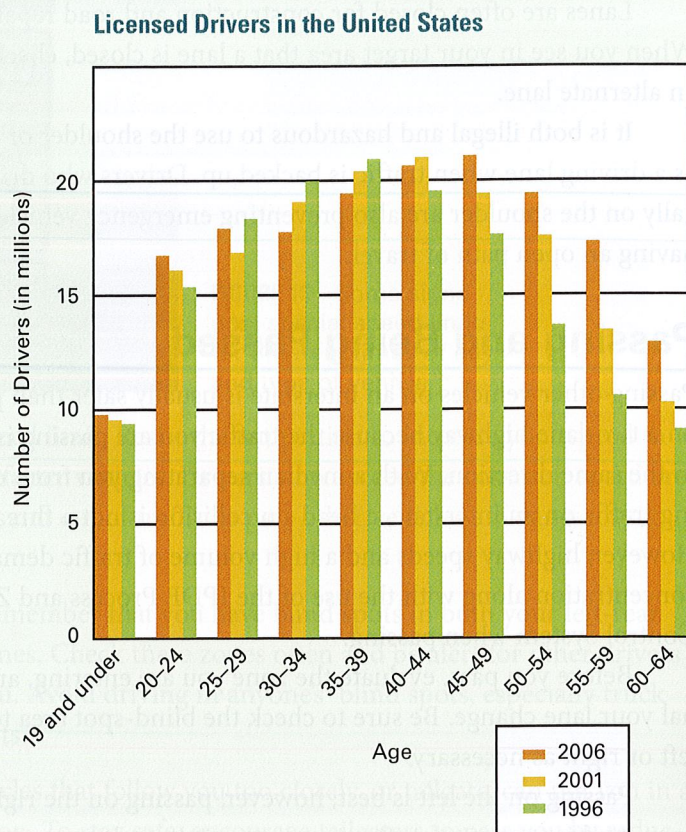
Coloring Graphs What does each color in the bar graph represent?

Coloring Graphs About how many licensed drivers aged 60–64 were there in the U.S. in 2001?

Coloring Which age group had the greatest increase in number between 1996 and 2006?

Coloring Data Which age group had the most licensed drivers in 1996? Which had the most in 2001, and in 2006?

Coloring Judgments Why do you think the number of licensed drivers in each age group with the most licensed drivers changed during the three years surveyed?



Review it 16.3

How is using the IPDE System on interstate highways different from using it on other roadways?

Why is it important to identify reversible lanes?

How does using the 3-or-more second rule when following a vehicle help you to be a low-risk driver?

Critical Thinking

Scenario Explain how drivers who tailgate put other drivers around them in a high-risk situation.

IN THE PASSENGER SEAT

Pass or Be Passed With an adult licensed driver, watch for cars that are passing you or that you pass. Record the distance traveled, your speed, and the number of times that you were passed and the number of times you passed a vehicle. Were there certain times of the day that you were passed more frequently than you were the one doing the passing? Record your data and share it with the class.



Lesson 16.4

EXITING CONTROLLED-ACCESS HIGHWAYS

Leaving a highway safely requires planning and skill. Plan for your exit as early as possible. Search to the target area, and when you see the sign for your exit, move into the lane designated by the sign.

Most exits provide a **deceleration lane**—an added lane where it's safe to slow your vehicle without blocking the vehicles behind you. Try not to decelerate until you are out of the travel lane and in the deceleration lane.

The deceleration lane leads into the **exit ramp**—the ramp leading off the highway. The posted ramp speed limit indicates the recommended speed for negotiating the exit safely. Pay close attention to the exit-ramp speed because a low speed may indicate that the exit leads into a sharp curve. Remember, if you miss the exit you want, go on to the next exit. Never stop or back up if you go past your exit.

OBJECTIVES

- Describe three possible exiting problems.
- Explain how to apply the IPDE Process to exiting a freeway.
- List the steps for exiting a freeway.

VOCABULARY

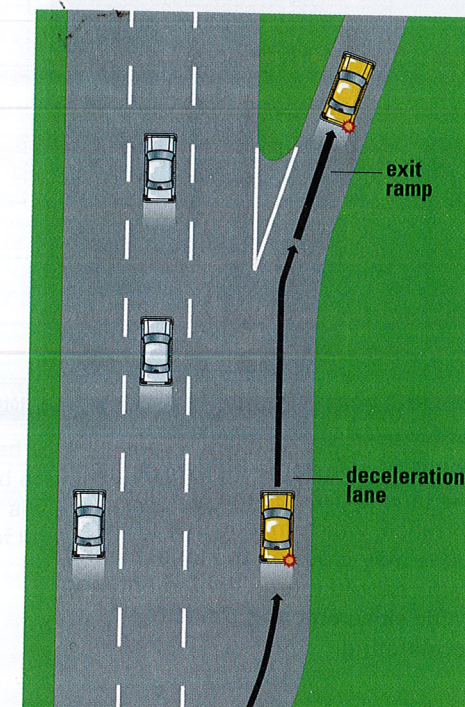
- deceleration lane
- exit ramp

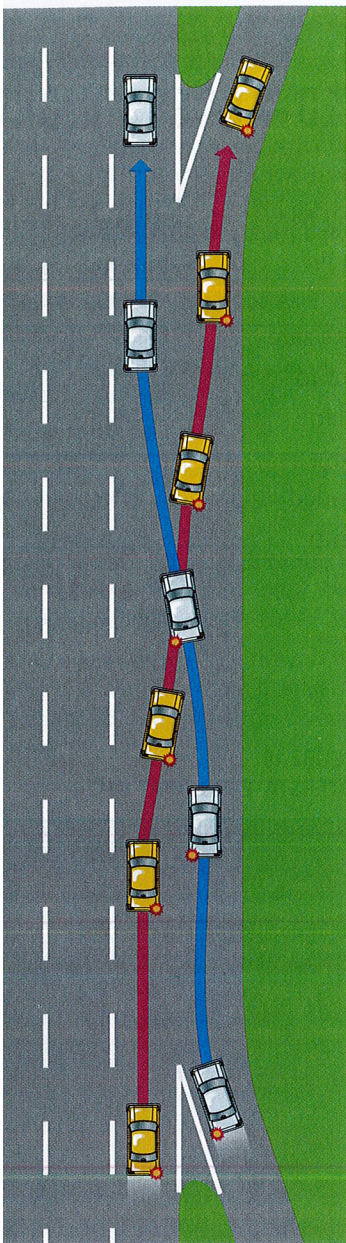
Applying the IPDE Process at Exits

Use the IPDE Process as you search well ahead to the target area.

1. Identify the green guide signs that show the distance to your exit.
2. Identify any potential weave pattern before you reach your exit.
3. Identify closed and open zones.
4. Predict actions of other drivers who might be using the same exit.
5. Decide on the best speed and lane position before getting in the deceleration lane.
6. Execute your maneuver smoothly and blend with slower traffic.

FIGURE 18 INTERSTATE HIGHWAY EXIT





On some highways, the exit ramp is used as the exit and the ramp, which means that drivers' vehicles may cross on the lane. Exiting a highway should merge behind entering traffic once entering traffic is slowing.

Even though leaving a highway should be a smooth operation, problems can occur. Be alert and ready to adjust to any potentially hazardous situations. If the ramp is backed-up, check your rear zone, flash your brake lights, and begin to reduce speed. Check your rear zone again to make sure traffic is slowing. If traffic is not slowing, try to pass the exit area smoothly. Rather than joining the overflow and risking a rear-end collision, go past the exit and drive on to the next exit.

Steps for Exiting

Exiting a highway has special risks. In order to avoid last-second decisions and sudden moves, identify your exit and the exit ramp speed at least one half mile before the exit. Predict a stop at the end of the exit ramp, as there is likely to be a traffic control device. Be alert when entering traffic on a local highway or street after leaving the highway. Expect two-way traffic, pedestrians, intersections, and the need for lower speeds. Once you've made the decision to exit, execute the following actions.

1. Check front and rear zones for traffic.
2. Signal and move into lane position 3 for right-side exits. Change only one lane at a time. Do not slow down until you are in the deceleration lane.



FIGURE 20

3. Move into the deceleration lane.
4. Turn your signal off and tap your brake lights to warn drivers behind that you are slowing. Slow gradually and keep 3 or more seconds of space ahead. Check your own speed, and adjust to the posted speed limit.
5. Check your speed frequently and check for line-of-sight and path-of-travel restrictions affecting your targeting path.

Some highways may have short deceleration lanes, so you will have to slow down more quickly. As you enter the deceleration lane,

- judge the length of the lane,
- identify the exit-ramp speed,
- check your speed and,
- most importantly, check traffic behind you.

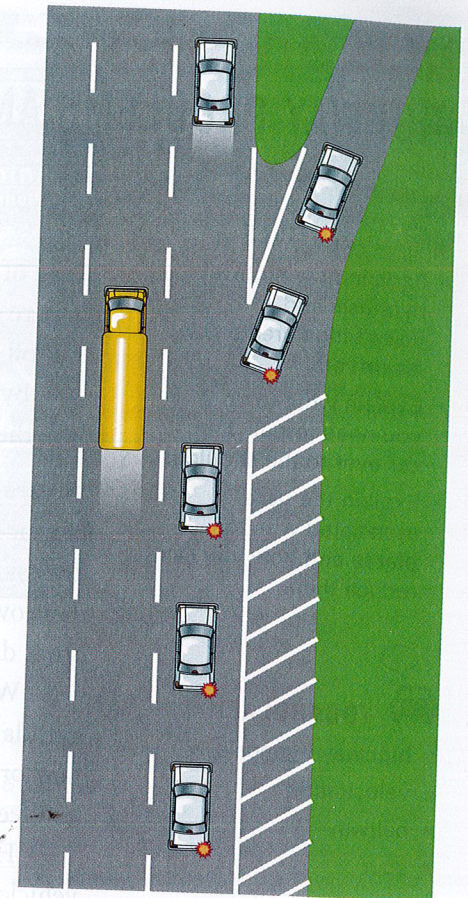


FIGURE 21 Traffic can back up from an exit ramp onto the highway. Ramp overflows are most likely to occur during rush hour traffic.

review it 16.4

1. Explain what to do if your exit lane has an overflow.
2. Explain how you apply the IPDE Process when you exit an interstate.
3. Why should you look one-half mile ahead before exiting an interstate highway?

Critical Thinking

4. Infer Why is it important to avoid last-second decisions when exiting an interstate highway?

IN YOUR COMMUNITY

Research Driving with an adult licensed driver, take note of the posted speed limits at various highway exits and the kind of highway you're exiting. Compare your data to find any connection between exit speed limits and types of highway. Report your conclusions to the class.



Lesson 16.5

Highway Problems and Features

OBJECTIVES

How highway signs and features create risk factors.
 What to do if you need to pull your vehicle to the shoulder.
 The risks associated with toll plazas and how you can avoid them.

VOCABULARY

Highway hypnosis
 Velocitation

Safe Driving

Some of the problems associated with driving on the interstate highway system are caused by drivers or other vehicles. In addition, construction zones and toll plazas present their own risks.

By being alert to possible problems and knowing how to react, you'll have the skills that will make you a low-risk driver.

Drivers Staying alert on highways can be a problem when you travel long distances at a steady speed or are tired. You can be lulled into an inattentive drowsy state known as **highway hypnosis**. Drivers who fail to recognize their own fatigue, or even ignore it, pose a high-risk to themselves and to other drivers.

When you first notice that your attention is less focused or that your eyelids want to close, stop at the next exit for a safe place and take a brief nap, or stretch or exercise before continuing. Do not drive any further if you feel that you're too tired to continue.

Hours of driving at freeway speeds can fool you into thinking your vehicle is moving slower than it actually is, causing you to drive too fast unknowingly. This condition, called **velocitation**, can be especially hazardous while you are approaching a curve of the exit ramp. Look at the suggested speed limit for the ramp and check your speedometer to be sure you're traveling at the posted speed.

Disabled Vehicles Whether you see a vehicle stopped on the shoulder or if your vehicle needs to pull over, be alert for potential conflicts. At first sign of trouble with your vehicle, check rear zones, signal, and move as far as possible away from traffic. Turn on your hazard flashers. If the vehicle is not far off the road, get everyone out and stand to the rear side of the vehicle as far away from traffic as possible. **Never stand in the highway to direct traffic.** When it is safe to do so, raise the hood and tie a white cloth to the antenna or door handle.

If you remain in a disabled vehicle, lock all doors. Keep your safety belts on and place your head against the head restraint.

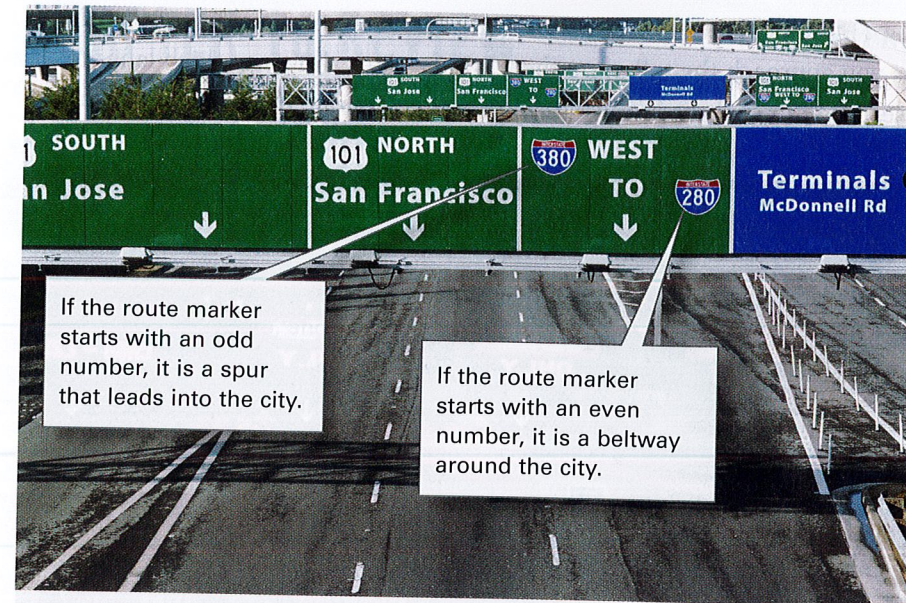


FIGURE 22 A three-digit route identifies beltways and spurs.

This will protect you in the event that a vehicle crashes into you. If you have a cellular phone, call for help. Ask anyone who stops to assist you to go to a phone and call for help. Never get into a stranger's vehicle.

Roadways

Watch for orange construction signs and be prepared to slow as soon as you identify the first one. Early warning construction signs with blinking lights indicate the construction-zone speed limit. Reduce your speed and follow the directions of the person directing traffic.

Belts and Spurs As you approach a major city you may have an option to take a **beltway**, or loop around the city, or a **spur**, or branch going into a city.

Toll Plazas

Toll plazas, where you pay a fee for the use of the highway, are hazardous environments for drivers. While stopping, and until there are at least two or three vehicles stopped to your rear, continue to monitor the rearview mirror every few seconds. If you see a vehicle approaching fast in the rear, tap your brake lights repeatedly to get the driver's attention.

Electronic tolls, as shown in **FIGURE 23**, are becoming more common. As you approach the toll plaza there will be signs showing which lanes to use. Sometimes there is a bypass lane that is separate from the toll plaza.



FIGURE 23 Electronic tolls make highway driving more convenient and reduce congestion because drivers don't have to stop to deposit coins.

view it 16.5

Explain why it's dangerous to drive on a highway for extended periods of time without a break.

Explain why it's important to check your speed at exit ramps.

Explain how you can reduce the risks drivers face at toll plazas.

Critical Thinking

State Cause and Effect What might happen if a driver fails to notice the beginning symptoms of highway hypnosis?

- 5. Infer** How does a disabled vehicle on the shoulder of the highway pose a risk for other drivers?

IN THE PASSENGER SEAT

Know Your Routes While driving on a highway with a licensed adult, make a list of all the highway route signs you see and identify them as freeways, U.S. highways, state or county highways, loops or spurs. Later check with the legend on a map to see if you identified the routes correctly.

CHAPTER 16 REVIEW

Lesson Summaries

16.1 CLASSIFICATION OF HIGHWAYS

- In the United States, there are three classifications of highways: the Interstate Highway System, the U.S. Highway System, and State Highway System.
- Freeways require controlled-access interchanges. Traffic is separated by grade elevation.
- An expressway may have non-controlled access, which means that they could have traffic lights or intersections.

16.2 ENTERING CONTROLLED-ACCESS HIGHWAYS

- Controlled-access highways have an entrance ramp, an acceleration lane, and a merging area.
- Factors such as short entrance ramps, short acceleration lanes, and high dividing walls contribute to entrance problems.

16.3 STRATEGIES FOR DRIVING ON HIGHWAYS

- Higher speeds and multiple lanes of freeways require you to get the visual information farther ahead.
- Search ahead to your target area for slower traffic or for drivers changing lanes.
- Reversible lanes can be deadly if you are not attentive.

16.4 EXITING CONTROLLED-ACCESS HIGHWAYS

- Most exits provide a deceleration lane where it's safe to slow your vehicle without blocking the vehicles behind you.

16.5 HIGHWAY PROBLEMS AND FEATURES

- Watch for orange construction signs, and be prepared to slow as soon as you identify the first one.
- As you approach a toll plaza, be aware of signs for the correct lane to use.

Chapter Vocabulary

- | | |
|-----------------------------------|-------------------------|
| • acceleration lane | • highway hypnosis |
| • beltway | • hole in traffic |
| • common speed | • interchange |
| • controlled access | • merging area |
| • deceleration lane | • non-controlled access |
| • entrance ramp | • ramp meter |
| • exit ramp | • reversible lane |
| • grade elevation | • spur |
| • high-occupancy toll (HOT) lanes | • velocitation |

Write the word or phrase from the list above that completes the sentence correctly.

1. The space between traffic clusters is called a(n) _____.
2. A(n) _____ is often used during commuter traffic to make more efficient use of traffic lanes.
3. Some entrance ramps have a(n) _____ to control traffic entering the highway.
4. Most U.S. highways have _____, which allow drivers to enter or leave the highway from any point.
5. _____ are places where drivers can cross over or under traffic as well as enter or leave the freeway.
6. Some highways have _____, which allow drivers to pay a fee in order to drive in an HOV lane with only one person in the vehicle.