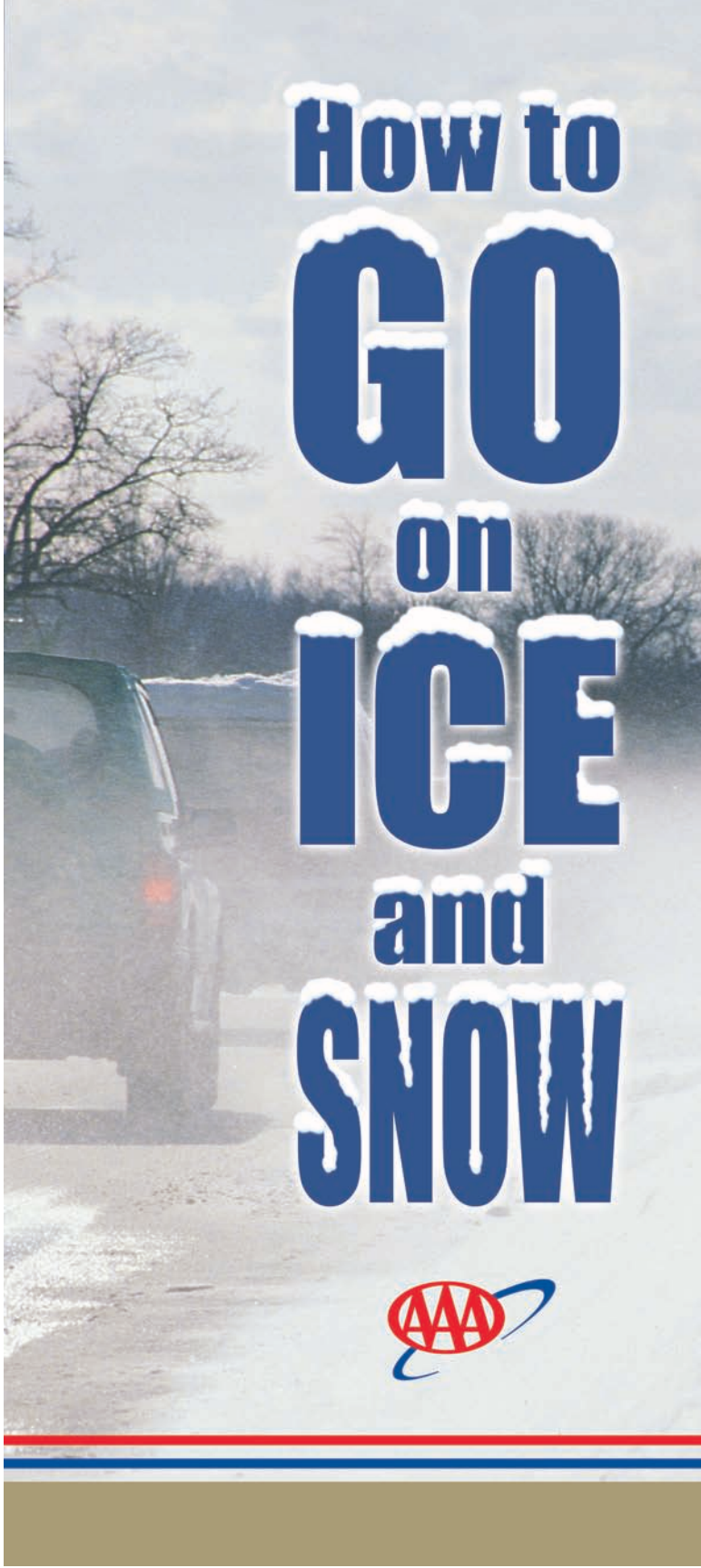


**How to
GO
on
ICE
and
SNOW**



How to Go on Ice and Snow presents well-illustrated, easy-to-read information that will aid you in becoming a safer and more efficient driver despite winter's adverse weather conditions. This pamphlet contains information on vehicle systems, driver preparation, winter driving techniques — maximizing traction, maintaining safe following distance and changing speed smoothly — and additional hints and precautions helpful to drivers of front-, rear- and all-wheel drive vehicles.

To derive the greatest benefit, it is suggested that you read the procedures and techniques described, then practice in a safe, secluded area.

Preparing the vehicle

From a mechanical aspect, winter conditions — wet, cold and icy weather — present the greatest challenge to your vehicle's operating efficiency. Since these conditions cannot be avoided, prepare for winter by performing a complete vehicle checkup in the fall. Check, or have your mechanic check, the following items:

1. Electrical system

Battery:

The heart of your vehicle's electrical system is the battery. Cold-weather starts require a battery that is fully charged. Have your battery checked and replaced, if needed. Have your alternator or generator, voltage regulator and drive belts checked, too.

Ignition system:

Damaged ignition wires, a cracked distributor cap or worn spark plugs can make starting difficult or may cause a sudden vehicle breakdown. A fall vehicle checkup will reveal any problems.

Lights:

During the winter, working lights become more critical for others to see you. Make sure all your lights and lenses are clean and functioning properly. Grime on headlight lenses reduces their effectiveness by as much as 90 percent.

2. Brake system

The ability to slow the vehicle is critical in any driving environment. Have your brakes checked regularly and do not delay any necessary maintenance or repairs.

3. Tires

The amount of traction that exists between the tires and roadway surface determines how well the vehicle accelerates, turns and stops. Make certain your tires are properly inflated and in good condition. If you live in a region that receives light to moderate snowfall, then a set of all-season tires (M+S rated) might be the answer to your winter driving needs. For driving in greater amounts of snow, tires specifically designed for use in snow would be a better choice.

While it is best to purchase tires in sets of four, if you only purchase two, mount them on the rear wheels. For extreme snow and ice driving conditions, tire chains can provide the best traction. If chains are necessary, they should be on all four tires.

4. The exhaust system

The exhaust system serves two main purposes. First, it carries off carbon monoxide and other harmful gases produced by the engine. Second, it muffles engine noise. Have a mechanic check your exhaust system for leaks in order to minimize the chances of carbon monoxide poisoning. Carbon monoxide is odorless, very hard to detect, and it can quickly cause death. If your car is stuck in the snow and you have the engine running, open a window slightly and clear snow away from the exhaust pipe.

5. Heating and cooling system

Make sure your vehicle's cooling system contains enough antifreeze to prevent freezing in cold weather. Keep the mixture fresh by changing it regularly and having the entire system checked for leaks. Please check your vehicle owner's manual to determine the best type of coolant for your vehicle.



6. Windshield wipers, washer, glass and vehicle exterior

Clean windows offer optimal visibility. Thus, wiper blades that streak the windshield should be replaced. The washer reservoir bottle should be filled with an antifreeze washer solvent. To prevent damage to your wiper blades or wiper motor, be sure the wipers are free of ice and snow and turned off before starting the engine.

7. Winter driving kit

The following items, carried in your vehicle, will be invaluable should an emergency develop:

- Bag of abrasive material (sand, salt or cat litter)
- Small snow shovel
- Snow brush
- Traction mats
- Flashlight
- Window-washing solvent
- Gloves or mittens
- Ice scraper
- Cloth or paper towels
- Booster cables
- Blanket
- Warning flares or triangles
- Cellular phone

Preparing the driver

To minimize the dangers associated with winter driving, both the vehicle and the driver must be prepared in advance. For the driver, this means approaching winter driving with the right frame of mind — always drive at a speed that matches the prevailing visibility, traffic and road conditions.

Select clothing that provides warmth, comfort and freedom of movement. Heavy garments and gloves offer warmth when outside, but after the vehicle's interior has warmed up, they should be removed. Stop the vehicle in a safe spot to remove any outdoor clothing rather than compounding a risky situation by struggling out of a heavy coat while driving.

A zip-fastened, lined jacket and a pair of thin leather gloves are ideal for winter motoring. They give appropriate warmth, comfort and freedom of movement both inside and outside the vehicle with minimal adjustment.

Correct seat position and use of safety equipment (safety belts, plus sunglasses to combat glare) will aid you in seeing and performing those gentle, smooth, precise movements necessary for safe winter motoring. Adjust your seat so that you sit no closer than 10 inches to the steering wheel and can see the road ahead. Shorter drivers may need a seat cushion or pedal extensions to be able to maintain this distance. Check mirrors and environmental controls before you start. Adjust your safety belt so that the belt is positioned



low across the hips and the shoulder harness is positioned across the center of the chest. Also, it is the responsibility of the driver to ensure that all passengers are properly seated and belted in the vehicle.

Winter driving techniques

Getting underway

To see and be seen by others requires the driver to clean all snow and ice from the entire vehicle — hood, roof, trunk, lights and windows. Snow left on any of these areas increases the possibility that visibility will be affected when the vehicle is in motion. Before departing, start your vehicle and turn the heater on for a minute or two before using the defroster. This will prevent moisture from fogging the windshield when warm air hits the cold glass.

Try to avoid driving when visibility is poor, but if you must drive, keep your speed low, and your headlights on low beam. If conditions worsen, pull off to a safe spot as soon as possible.

Clear a path in front of the wheels for several feet. This can be accomplished by driving forward and backward in the parking space, or if the snow is too deep, some additional shoveling may be required.

With the front wheels pointed straight to minimize rolling resistance, shift to drive (use second gear for manual transmissions) and with gentle pressure of the accelerator, try to ease out of the parking space without spinning the wheels. If you let the wheels spin, you will only dig deeper into the snow.

When more traction is needed, use traction mats or spread some sand, salt or any handy abrasive material in front of and in back of the drive wheels. When using devices under the wheels for additional traction, or when wheels are digging into dirt or gravel and you are receiving pushing assistance, **do not let anyone stand directly ahead or behind the drive wheels** as they may be injured by objects thrown by the spinning tires. Stop if the wheels continue to spin and create a deeper rut, and consider attempting to rock the vehicle out of the rut. To rock a vehicle, start slowly in low gear (use second gear for manual transmission vehicle). When the vehicle will go no farther forward, release the accelerator to permit the car to roll back. When the

vehicle stops its backward motion, apply minimum pressure on the accelerator again.

Repeat these actions in rapid succession. Each rock should move the vehicle a little farther forward or back of the hole you are in. When you rock, you must use minimum power to help prevent the wheels from spinning and digging in deeper. **Check the owner's manual for the recommended procedure.**

Following

Normal following distances for dry pavement (three to four seconds) should be increased to eight to 10 seconds when driving on icy, slippery surfaces. This increased margin of safety will provide the longer distance needed if you have to stop.

On a four-lane highway, stay in the lane that has been cleared most recently. Avoid changing lanes because of potential control loss when driving over built-up snow between lanes.

Remember: traction is greatest just before the wheels spin. Gentle pressure on the accelerator pedal when starting is the best method for retaining traction and avoiding skids — especially if your vehicle is not equipped with traction-assist technology. If your wheels start to spin, let up on the accelerator until traction returns. **Do not use cruise control when driving on any slippery (wet, ice, sand) surface.**

Once underway, keep going. When approaching a hill, observe how other vehicles are reacting and keep far enough behind the vehicle immediately ahead so that you will not have to slow down or stop. This will allow you to maneuver around any stuck vehicles and to increase your speed (within reason) at or near the bottom of the hill to give you the extra momentum to carry you over the top. As you reach the crest of the hill, reduce your speed and proceed down the hill as slowly as possible. Minimize brake use on very slippery, icy hills; if further speed reduction is needed, gentle, slow brake application (squeeze braking) is recommended to avoid loss of control.

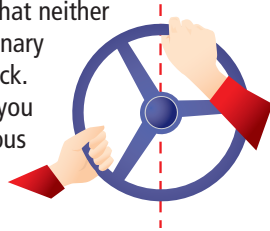
Steering

Snowy or icy surfaces make steering difficult and require smooth, careful, precise movements of the steering wheel. Skidding in which the front or rear moves laterally is caused by hard acceleration or braking, speeds too fast for conditions, and quick jerky movements of the steering wheel.

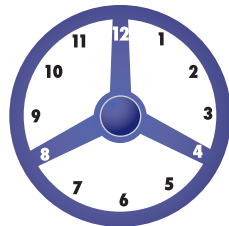
You may need to take evasive action to avoid a collision. Steering is preferred to braking at speeds above 25 mph because less distance is required to steer around an object than to brake to a stop. In slick conditions, sudden braking can lead to loss of control.

Emergency steering methods:

1. The push-pull-slide method of steering is performed by shuffling your hands so that neither hand crosses over the imaginary line between 12 and 6 o'clock. Since the arms never cross, you are able to provide continuous adjustments in either direction.



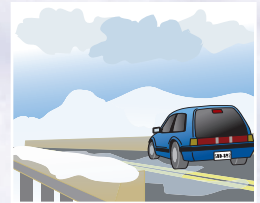
2. The fixed-hand steering method allows rapid 180-degree steering to either direction, but it has one shortcoming. This method is confining in that your arms may get locked together as you attempt to steer past 180 degrees, leaving you in an awkward position to make further fine adjustments.



Braking

Stopping on slippery surfaces requires longer visibility, following and stopping distances. Drivers proficient at driving and braking on slippery surfaces have developed these techniques by practicing in secluded areas. These drivers also are knowledgeable of the additional dangers associated with and created by low temperatures. The stopping distance required on ice at 0°F is twice the amount required at 32°F.

Shaded spots, bridges, overpasses and intersections are areas where ice is likely to form first or be the most slippery, because the shiny ice surface has either been polished by previous vehicle traffic, or a thin layer of water covers the melting ice below. To compensate for the longer stopping distances required when driving on slippery surfaces, focus your attention as far ahead as possible (at least 20 to 30 seconds) and allow for the greatest margin of safety to the front. When road conditions change, so do the braking requirements.



Braking without antilock brakes

If you don't have antilock brakes, the best way to stop is threshold braking. Keep the heel of your foot on the floor and use the ball of your foot to apply firm, steady pressure on the brake pedal to the "threshold" of locking your brakes. Remember, you must keep your heel on the floor. If your heel leaves the floor, the wheels could lock because you're controlling the brake pedal with your thigh muscles instead of your ankle, which are incapable of finer control.



Braking with antilock brakes

If you have an antilock braking system (ABS), do not remove your foot from the brake. When you put on the brakes hard enough to make the wheels lock momentarily, you will typically feel the brake pedal vibrate and pulse back against your foot. This is normal. **Do not pump the pedal or remove your foot from the brake.** The system is working as it was designed to work.

How ABS works:

In a vehicle that has antilock brakes, a sensor located at each wheel detects when the wheel stops turning and starts to skid. As the wheel begins to lock, the antilock

system relieves the pressure just enough to allow the wheel to turn again. This allows you to steer while slowing the vehicle. The vehicle's computer performs this pulsing action faster than humans can manually pump the brake pedal. Pumping the pedal works against the system by providing false information.

Skids

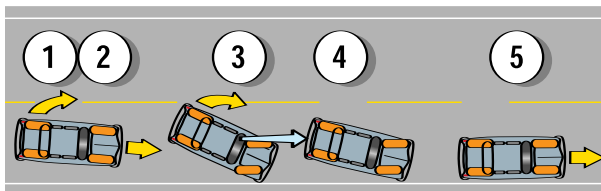
A skid occurs when you apply the brakes so hard that one or more wheels lock, or if you press hard on the accelerator and spin the drive wheels. Skids also occur when you are traveling too fast on a curve and encounter a slippery surface.

Skids fall into two groups: rear-wheel skids and front-wheel skids. Regardless of the type of skid you encounter, to regain control of your vehicle, **do not panic**.

Rear-wheel skids

Effective skid-control maneuvers — and a calm approach — will help you regain control. If the rear wheels lose traction, resulting in an oversteering situation, use these steps to regain control:

1. Continue to look at your path of travel down the road.
2. Steer in the direction you want the front of the vehicle to go.
3. Avoid slamming on the brakes. Although hitting the brakes is a typical response, slamming the brakes will only further upset the vehicle's balance and make it harder to regain control.
4. When the rear wheels stop skidding, continue to steer to avoid a rear-wheel skid in the opposite direction.

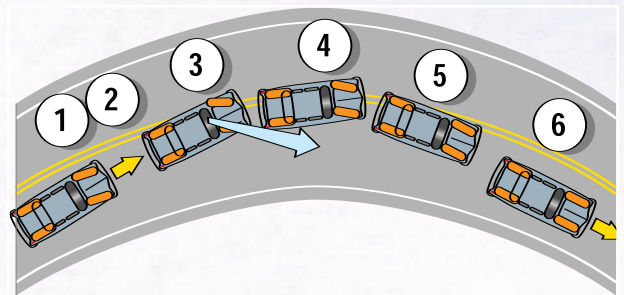


Front-wheel skids

Front-wheel skids are caused by hard braking or acceleration if your vehicle has front-wheel drive. When the front wheels lose traction, you will not be able to steer the vehicle. Compared to rear-wheel skids, front-wheel skids are easier to correct and less hazardous because there is no risk of the vehicle skidding in the opposite direction. Regardless of whether the vehicle has front-, rear- or four-wheel drive, the best way to regain control if the front wheels skid is:

1. Continue to look where you want to go.
2. Steer in the direction you want the front of the vehicle to go.
3. Avoid slamming on the brakes. Although hitting the brakes is a typical response, slamming the brakes will only further upset the vehicle's balance and make it harder to regain control.
4. Wait for the front wheels to grip the road again. As soon as traction returns, the vehicle will start to steer again.
5. When the front wheels have regained their grip, steer the wheels gently in the desired direction of travel.

The most efficient technique for braking under these conditions in non-ABS vehicles is to use threshold or squeeze braking.



Preparation checklist

- 1 Before winter arrives, prepare your vehicle for use on ice and snow.
- 2 Avoid driving while fatigued.
- 3 Use your safety belt every time you get in the vehicle.
- 4 Never warm up a vehicle in an enclosed area, such as a garage.
- 5 Never leave your vehicle unattended with the engine running.
- 6 Make certain your tires are properly inflated.
- 7 Keep your gas tank at least half full to avoid gas line freeze-up.
- 8 If possible, avoid using your parking brake in cold, rainy and snowy weather.
- 9 Do not use cruise control when driving on any slippery surface (wet, ice, sand).
- 10 Always look and steer where you want to go.

Driving in ice and snow conditions can be very challenging. The key to safe driving is to adapt to these conditions. Follow these tips to arrive at your destination safely.



Traffic Safety Programs
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