



FACT SHEET

Module 5.1

Adverse Conditions Flooding

When precipitation in a particular watershed is channeled quickly to the outflow point of the basin, a sudden increase in discharge can be caused. These floods usually occur within six hours of a large rainfall event.

More than half of all low-water crossing vehicular related deaths occur at night. Under conditions of low-visibility the vulnerability of the driver and passengers to the hidden danger is greatly magnified.

Useful tips for drivers in flooded areas:

- If you live in an area where flooding may occur, move your vehicle to higher ground if flooding is expected. As well as the risk of damage to your vehicle by leaving it in a flooded area, it may also be a hazard or cause obstruction to emergency services.
- Do not drive unless your journey is absolutely necessary.
- If you have to drive in a flooded area take caution. Do not attempt to drive through water if you are unsure of the depth.
- Don't drive through fast-moving water, such as at a flooded bridge approach; your car could be swept away.
- Drive slowly and steadily to avoid creating a bow wave, and allow on-coming traffic to pass first.
- Keep the engine revving by slipping the clutch otherwise water in the exhaust could stall the engine.
- Modern vehicles are fitted with catalytic converters in the exhaust system. The catalyst normally works at high temperatures and may crack if it is submerged in water. Replacement catalysts are expensive.
- The air intake on many modern cars is located low down at the front of the engine bay and it only takes a small quantity of water sucked into the engine to cause serious damage. All engines are affected but turbo-charged and diesel engines are most vulnerable.
- Be considerate—driving through water at speeds above a slow crawl can result in water being thrown onto sidewalks, soaking pedestrians or cyclists.
- If your car stalls, immediately abandon it and climb to higher ground. Watch your footing. Just six inches of fast-moving floodwater can sweep a person off his/her feet.
- Test your brakes as soon as you can after driving through water.
- If the vehicle has stood in the flooded area for any prolonged period contact your local car dealer or mechanic for further advice.
- If the vehicle has only been in a flood for a short period, drive with extreme caution and take the car to be checked at the earliest opportunity.

Myths and Facts

Myth: The size and weight of my vehicle will keep me from floating away.

Fact: People have extreme confidence in the size and weight of their vehicle, and think it can't be washed away, but it can be very easily.



Fact: A 46,000-pound, fully-loaded cement truck was swept down the Los Angeles River in less than two feet of swift water. Eighty percent of ALL FATALITIES in flash floods are the result of drivers ignoring obvious warning signs on open roads, including a washed out road ahead, or driving around marked flood barricades placed by public safety personnel!

Myth: Driving fast through a flooded roadway will help me cross safely.

Fact: Driving fast through water will cause your vehicle to hydroplane. Once this begins, all control is lost. Water can also enter the air intake and stall the engine.

Myth: If many people have already been able to drive through flooded areas and didn't have any problems, it's probably ok for me to drive through, too.

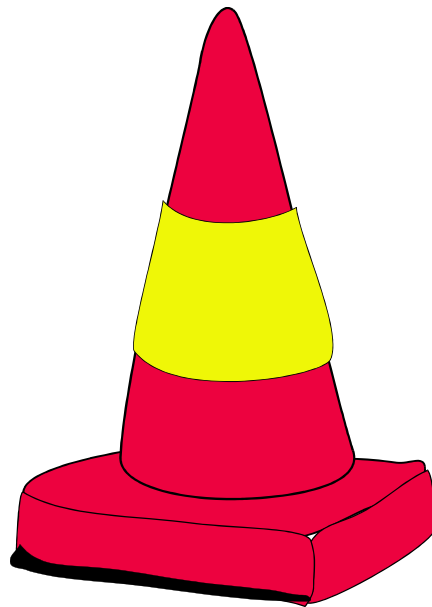
Fact: This is probably the most life-threatening misconception. What people do not realize is that only a very small increase in water level will make a big difference. If you drive through 13 inches of standing water 300 times in your life and pass safely, the 301st time you may get stuck when the water level increases to 15 inches — just two inches higher than last time.

Fact: Just six inches of fast-moving flood water can knock you off your feet, and a depth of two feet will float your car.

Fact: Water weighs 62.4 lbs. per cubic foot and typically flows downstream at six to 12 miles an hour.

Fact: When a vehicle stalls in the water, the water's momentum is transferred to the car. For each foot the water rises, 500 lbs. of lateral force are applied to the car.

Fact: For each foot the water rises up the side of the car, the car displaces 1,500 lbs. of water. In effect, the car weighs 1,500 lbs. less for each foot the water rises.





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Module 5.1

ADVERSE CONDITIONS FLASH FLOODS

HOW DO FLASH FLOODS OCCUR?

Flash floods are caused by two key elements, intense rain that falls in a short amount of time. Intensity is the rate of rainfall, and duration is how long the rain lasts. Flash floods generally occur during or right after a severe thunderstorm.

In some cases, small streams a few feet wide by a few inches deep can swell to over 12 feet deep and 80 feet wide in less than five minutes. To put things in perspective, remember that water is one of the most powerful forces of nature. As little as six inches of fast moving water can knock you off your feet. Fast-moving water two feet deep can wash away a vehicle.

If the National Weather Service issues a Flash Flood Warning, or you observe water rising quickly, you should take action immediately.

- Get far away from areas subject to flooding (dips, low spots, canyons, dry creek beds, or along a stream). Seek higher, safer ground.
- Avoid areas near rivers or streams and areas that are already flooded. Roads that are underwater may no longer be intact. NEVER drive through flooded roadways.
- If your vehicle stalls, leave it immediately and seek higher ground. Rapidly rising water may engulf the vehicle and sweep it away.
- Be very careful at night when it is harder to see flood dangers.
- Do not park your vehicle or camp along streams or dry streambeds during threatening conditions.



Topography, soil conditions, and ground cover also play an important role. Flash floods occur within a few minutes or hours of excessive rainfall, a dam or levee failure, or a sudden release of water held by an ice jam. Flash floods can roll boulders, tear out trees, destroy buildings and bridges, and scour out new channels. Flash flood-producing rains can also trigger catastrophic mud slides. You will not always have a warning that these deadly, sudden floods are coming. Most flood deaths are due to FLASH FLOODS.

Most flash flooding is caused by slow-moving thunderstorms, thunderstorms repeatedly moving over the same area, or heavy rains. Floating debris or ice can accumulate at a natural or man-made obstruction and restrict the flow of water. Water held back by the ice jam or debris dam can cause flooding upstream. Subsequent flash flooding can occur downstream if the obstruction should suddenly release.

CLUES TO PROBLEMS

- Water weighs 62.4 lbs. per cubic foot and typically flows downstream at six to 12 miles an hour.
- When a vehicle stalls in water, the water's momentum is transferred to the car. For each foot the water rises, 500 lbs. of lateral force are applied to the car.
- But the biggest factor is buoyancy. For each foot the water rises up the side of the car, the car displaces 1,500 lbs. of water making the car weigh 1,500 lbs. less.

WHAT YOU CAN DO

Know your flood risk and elevation above flood stage. Do your local streams or rivers flood easily? If so, be prepared to move to a place of safety. Know your evacuation routes. Keep your automobile fueled; if electric power is cut off, gas stations may not be able to operate pumps for several days.



WORK SHEET

Module 5.1

LOW-WATER CROSSING

Name _____

Date _____

Score _____

Complete the following questions.

1. Describe a low-water crossing.
2. How would you recognize a low water-crossing?
3. Why are low-water crossings so dangerous?
4. Where does a driver look for problem areas?
5. What types of vehicles are a problem at low-water crossings?
6. How much water does it take to lose control of the vehicle?
7. How can a driver avoid potential problems?