

Arming the transportation industry with safety solutions

## "Bridge Freezes Before Road"

**M**ost people who live in cold regions have seen the sign - "bridge freezes before road," and many people are aware that caution should be used when driving on bridges during cold weather since they can freeze easily. Bridges freeze before roads for a number of reasons, most of which involve very basic science. Being aware of the conditions that make bridges freeze before roads will help you be more focused when approaching a bridge, and could easily prevent an incident.

### THE CAUSE

There are several reasons why bridges freeze before roads:

- Unlike a roadway, a bridge is exposed from above and below. Roads don't freeze over as quickly because they can take advantage of insulation and warmth from the soil below. Bridges, on the other hand, are beset with cold temperatures from all sides, which can cause them to ice over quickly. Bridges have no way to trap any heat, so they will continually lose heat and freeze shortly after temperatures in the atmosphere hit the freezing point.
- Bridges freeze rapidly because many of them are located over cold spots, like frozen rivers or deep ravines.
- The construction materials of a bridge affect its temperature. Most bridges today are built with steel and concrete, both of which are excellent heat conductors. Because these materials conduct heat, any heat that the bridge has travels through the bridge to the surface where it is quickly lost through the air flow around it. Roads are mostly made from asphalt, which is a poor conductor of heat, and that lessens the rate of heat loss from the road. Bridges often quickly reach the general air temperature, so when the thermometer reads 32 degrees Fahrenheit (0 degrees Celsius), the bridge will freeze.

### SURPRISE!

Drivers must pay close attention when driving on bridges in icy weather, even if ice isn't apparent on the bridge. Sometimes, ice can hide under patches of snow, causing you to lose control. This is especially true in areas which do not salt, sand, or plow regularly; an accumulation of ice and snow may have settled on the bridge, making it very dangerous. In addition, ice can sometimes be hard to see on dark roadways, especially at night, when ambient temperatures get even colder.

An icy bridge's most dangerous threat is their element of surprise - they catch drivers off guard, who are traveling at full speed because the rest of the roads are either clear or just a little wet. The consequences of driving onto ice at highway speeds can be catastrophic, as the loss of control and impacts happen much faster than in most other conditions. Slides are often unrecoverable and chain-reaction type accidents are common, as additional vehicles will often lose control in the exact same location.



### WHEN IT'S FROZEN

Because bridges freeze before roads, drivers should assume that bridges are frozen when the ambient temperature is very cold, even if the roads are clear. When there is potential for icy conditions, drive cautiously and follow these tips:

- Know if the temperature dropped to below freezing overnight and look for frost on vehicles to give a hint that bridges may be frosted up.
- Ensure a close check of the tread wear on your tires during your pre-trip inspection; your tires don't develop as much grip in cold weather as in warmer temperatures.
- Keep your vision high and look for trouble well up the road. Other vehicles crossing a bridge ahead of you can often tell you if it's slippery.
- If a bridge surface is a little shinier than the road, expect it to be slicker and probably icy.
- Should you encounter an icy patch on a bridge, remove your foot from the accelerator, do not brake suddenly or turn the wheel sharply, keep steady speed across the bridge and be smooth in your steering and other controls. The laws of physics say that if you do nothing to change the direction or speed of your vehicle while on ice, it will continue to travel in the direction it was going.

The bottom line is that a bridge will follow the air temperature very closely. If the air temperature falls below freezing, a bridge's surface will fall below freezing quickly. Any rain or snow, therefore, will freeze and stick to the bridge making it slick.

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*The Shield*  
"Bridge Freezes Before Road"  
Quiz



Driver Name: \_\_\_\_\_ Date: \_\_\_\_\_  
Please Print

Driver Signature: \_\_\_\_\_

Please circle one correct answer for each question.

1. Roads don't freeze over as quickly as bridges because they can take advantage of \_\_\_\_\_ from the soil below.
  - a. cold and wetness
  - b. nutrients
  - c. insulation and warmth
  - d. none of the above
2. An icy bridge's most dangerous threat is \_\_\_\_\_.
  - a. the potential for collapse
  - b. their element of surprise
  - c. the materials with which they are constructed
  - d. all of the above
3. Bridges have no way to trap any heat, so they will continually lose heat and freeze shortly after temperatures in the atmosphere hit the freezing point.
  - a. True
  - b. False
4. If a bridge surface is a little shinier than the road, expect it to be \_\_\_\_\_.
  - a. slicker and probably icy
  - b. a new surface
  - c. safer
  - d. none of the above
5. Should you encounter an icy patch on a bridge, you should do which of the following?
  - a. remove foot from accelerator
  - b. do not brake suddenly
  - c. be smooth in your steering
  - d. all of the above

