



# Managing Snow and Ice

Kansas Department of Transportation



*A guide to KDOT's winter maintenance operations*

Updated November 2016

## ◀ You Can Count on Us

During the winter months, trained highway crews with the Kansas Department of Transportation (KDOT) are ready to treat or plow snow, slush and ice. Their knowledge and experience in handling these serious situations are essential for the safety of travelers and the efficient movement of commerce on Kansas highways.

Communication between supervisors and crews is key to keeping roads treated and open during severe weather.

With about 10,000 miles of Kansas highways that include about 25,000 lane miles, teamwork is critical to KDOT's managing snow and ice.



## By the Numbers

**81,752**

Average tons of salt KDOT used per year for the past 5 years



**\$15.57 million**

Per year amount KDOT spent on winter maintenance for the past 5 years



**373**

Municipalities that have agreed to clear snow from state highways in their city limits



**591**

Number of tandem axle trucks used year-round



**10,000**

Miles of highway that includes about 25,000 total lane miles



**3.9 million**

Average gallons of salt brine used in the last two years



**115**

Number of salt brine machines



**2**

Number of tow plows



## Getting Ready

### For the season

KDOT employees make sure preparations for snow and ice control are done by mid-October every year including:

- ◆ Ready equipment /mounting attachments to trucks used year-round
- ◆ Stocking materials
- ◆ Training employees
- ◆ Reviewing assigned routes
- ◆ Placing snow fences



### For a storm

Each winter storm is unique. It could be a light, moderate or heavy snowstorm and have frost or black ice, freezing rain or sleet. Many times it's a mixture of these with varying amounts across the state.

Widespread combinations of sub-freezing temperatures, rain, sleet, snow, ice and wind can complicate efforts to keep roads passable.

Supervisors consult with meteorologists and monitor weather forecasts to help KDOT personnel plan the equipment, materials and



people needed for a coming storm. They also monitor pavement conditions using permanent sensing stations in KDOT's Road Weather Information System and vehicles equipped with infrared pavement temperature sensors. Efforts are focused on staying ahead of a storm.



## ← Praise from the Public

*KDOT's response to winter storms draws public praise - below is a sampling of e-mails and letters KDOT receives regularly.*

*Just like to say kudos to @ KansasTurnpike and @ KDOTHQ road crews. Great job clearing the highways!  
Janet M. Carter*



*I want to say a huge thank you to the crews who have worked tirelessly for the past two days to keep the roadways as clear as possible. I am disabled and my wife has to commute from Westmoreland to Manhattan to go to work. Knowing that you guys have worked on the roads around the clock brings me a greater peace of mind as she travels and for that I am very grateful. Thank You!  
Lyle Caudill*

*You should be commended on doing a good job organizing and clearing off the streets so quickly yesterday. Within 5 hours after the snow stopped most everywhere was passable and Kellogg was clear and dry. Have a good day.*

*Matt Catanese*

*I want to say thank you to all of the men and women who prepared and cleared off the highways in Kansas during this recent storm. My Grandma passed and her funeral was on Saturday which was almost five hours from my home. I'm so thankful the roads were clear and dry so I could say goodbye to her. Keep up the great work! It is much appreciated.*

*Danea Cramer*

*Thank You, Thank You, Thank You for all of your hard work during this crazy storm! You all are amazing! I am so impressed by how good the roads and highways are after such a strong storm! I live in Olathe and have driven all over the city today. I think you all are under appreciated and I just can't thank you enough for working so hard to keep the road safe for travelers!*

*Sincerely, Mindy Morrison*



*Big thank you to the @ KDOTHQ and @ KansasTurnpike employees who cleared the snow. I-70 from Salina to Lawrence was wide open.*

*@KDOTHQ Please tell your overnight crews THANK YOU for their hard work on I-70 last night. Their work is very appreciated.*

*Caleb Hays*

## Teamwork - Getting the Job Done

Equipment Operators are KDOT's front line. For much of the year as they perform the routine maintenance that keeps the state highway system in good condition, they work in relative anonymity.

But when a winter storm blows into Kansas, their work is front and center. The state depends on them to work round-the-clock in the worst conditions to keep the roads open and safe for travel. And, the crews take great pride in their work.

As KDOT streamlines its operation, it is still the agency's priority to keep all of its trucks on the road round-the-clock during a major snowstorm. So KDOT is depending more than ever before on non-traditional snow plow drivers.

To operate all snow plows for two 12-hour shifts during a day, the state would need 1,182 drivers. All drivers must have Commercial Driver's Licenses (CDL).

While KDOT falls short of having that many Equipment Operators, it bolsters the ranks of snow plow drivers by turning to more than 200 Engineering Technicians, who are also CDL holders. KDOT also has more than 30 temporary snow and ice CDL drivers available to help during snow events.

KDOT's field leaders also help accomplish the agency's goals by communicating during storms and reassigning snow crews to the areas where they are most needed.



## Keeping Kansas' Economy Rolling



KDOT's commitment to keep the roads open during the winter and in good condition year-round is important to the citizens of Kansas.

It is estimated that on an average February weekday, the Kansas Interstate and State Highway System carries more than \$175 million in goods, as well as commuters earning \$30 million in daily wages.

KDOT prioritizes its snow and ice operations and the maintenance positions that are the backbone of these operations to lessen the impact of winter weather on these economic activities.



### Transportation Sustains a Diverse Kansas Economy

- ◆ Every year, 30 million vehicle miles and \$900 billion in freight utilize the Kansas transportation network.
- ◆ Key economic sectors, like services, agriculture and manufacturing, depend on transportation.



## ◀ Clearing the Roads

### Which Roads are Cleared First/Most Often?

To use resources effectively and efficiently, KDOT must decide which roads are treated and plowed most frequently. KDOT divides the highways into three categories based on how much they're used.

Each category has a level of service for snow and ice control that KDOT crews attempt to achieve. KDOT aids emergency vehicles responding to calls if requested on all categories of roads below:

- ♦ **Category I** roads are treated and plowed most frequently. They are multi-lane roads with more than 3,000 vehicles daily.
- ♦ **Category II** roads are treated and plowed frequently. They are two-lane roads with 1,000 to 3,000 vehicle daily.
- ♦ **Category III** roads are treated and plowed less frequently. These are two-lane roads with less than 1,000 vehicles daily.



### Closing a Road

There are times when the weather makes it impossible to maintain a passable highway. When that happens, the only alternative is to close the road. KDOT does not want motorists to be stranded on a highway that is impassable or has no safe lodging. The agency collaborates with state and local law enforcement when a road needs to be closed. KDOT may close a highway for one or more reasons, including:

- ♦ Lodging and truck parking spaces are becoming scarce as travelers seek shelter.
- ♦ Road crews can't maintain a passable roadway due to overwhelming snow/ice conditions or vehicle crashes that block the roadway.
- ♦ Conditions in a neighboring state force officials to close the road in that state. In that case, KDOT may have to progressively close sections of the highway as local lodging and truck parking spaces fill to capacity. This may occur even though roads in Kansas are passable. This is common for highways that link Kansas and Colorado, such as I-70.

## ◀ KDOT Winter Tools

- ♦ **Anti-Icing:** The application of liquid chemicals, or in some cases solid chemicals, to prevent the formation of frost or the bonding of snow or ice to pavement.
- ♦ **De-icing** - Applying salt or salt brine to the roadway after snow or ice accumulation.
- ♦ **Salt Brine** - Salt brine is a liquid chemical applied to roadways that sticks to the pavement and cannot be blown off by passing vehicles.
- ♦ **Ground-speed activated salt spreader** - KDOT trucks are equipped with an electronic salt application system that automatically dispenses the desired amount of salt. These systems vary the amount of salt being spread so it is right for the truck speed.
- ♦ **Tandem Axle Plow Trucks** - Through the years, KDOT has gradually replaced its single axle trucks, which hauled 5 tons of material, with larger and more powerful tandem-axle trucks that haul 10 to 12 tons.
- ♦ **Infrared temperature sensors** - Sensors are mounted on vehicles to provide the operator with pavement and outside air temperatures. This helps the operator determine if there is potential for the roadway to freeze and when to start their treatment cycle.
- ♦ **Pre-wetted salt** - Road salt is sprayed with salt brine to enhance the salt's melting capability in cold weather. Pre-wetting jump starts the melting process so the salt will act more quickly.
- ♦ **Salt** - Salt can be applied in solid, pre-wetted or liquid brine forms.
- ♦ **Chemical abrasives** - Chemical abrasives are different mixtures of salt and sand. These help prevent ice and snow pack conditions.
- ♦ **Wing Plow** - A plow attachment that allows operators to clear a full lane. KDOT has equipped one-third of its plow trucks with wing plows in the last decade.

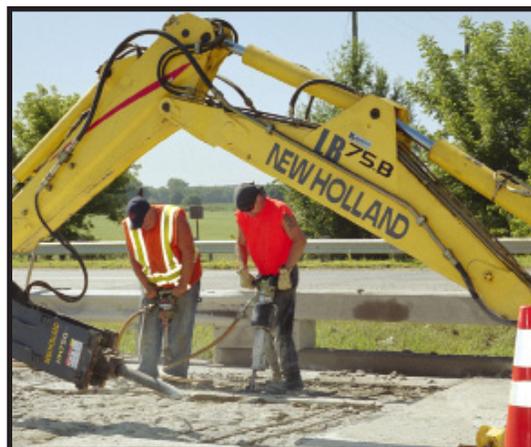


## Other KDOT Maintenance Activities

*KDOT maintenance crews maintain the highways year-round. A few of the many duties they are responsible for when not battling snow and ice include:*



- ◆ Providing **temporary traffic control** and **assisting law enforcement** with localized emergencies, accidents, etc.
- ◆ Repairing **pavement cracks and joints**, filling **potholes and wheel ruts**, **mudjacking pavement**, filling **edge drop offs**
- ◆ Repairing/replacing highway **traffic signs**.
- ◆ Mowing/maintaining more than **145,000 acres of right-of-way** along highways and weed control.
- ◆ Placing **striping** on pavements.
- ◆ Repairing/maintaining **guard rails, drainage structures, bridges, shoulders, slide areas, concrete barriers, rumble strips, lighting, culverts, curb/gutters, rest areas, etc.**
- ◆ Removing **litter/brush**, brooming roadways and bridges



## When Disaster Strikes, KDOT is There

*KDOT maintenance employees respond to numerous disasters every year. Events that occurred in 2007 are good examples of these efforts.*

**An F-5 tornado destroyed 95 percent of Greensburg.** A KDOT Superintendent was one of the first on the scene. He didn't wait to be told that KDOT needed to get forces there quickly. Because of the enormity of the storm, the agency assisted with many efforts such as clearing/sweeping highways and city streets to provide safe access for all emergency support. KDOT crews hauled away 17,680 loads of debris, created 341 street signs and provided the vital means of communications by distributing 100 handheld radios to emergency agencies. KDOT also had the U.S. 54/U.S. 183 junction closed an hour after the tornado and round-the-clock for one month so clean-up and recovery efforts could proceed safely and efficiently.



**A total of 21 highways were closed when flooding affected southeast Kansas.** Highways were damaged in 12 counties as areas received up to 21 inches of rain.

Employees staffed barricades round-the-clock for many days, assisted motorists and performed repair work on the roadways.

**A huge storm dumped up to 32 inches of snow and ice in western Kansas.**

Eighteen sections of roads were closed, including I-70 from Salina to Colorado.

KDOT crews worked round-the-clock for weeks to remove snow, treat roads, assist stranded motorists, reopen roadways quickly and support local officials. Opening the roads was critical so that utility crews could get in and help the 60,000 people without power and repair the 10,500 downed power poles.



# ◀ KDOT Keeps You Informed

KDOT offers these free Kansas travel information services:



**Website - [www.kandrive.org](http://www.kandrive.org)** - a one-stop gateway for travel information. Get maps, camera and message sign views and more.

**511 Phone** - Call 5-1-1 from any phone in Kansas or 1-866-511-KDOT (5368) from anywhere in the U.S. for road conditions, road work and travel weather information.

**511 Mobile** - Visit <http://511mm.ksdot.org> on your mobile device to access similar information.



KDOT maintenance crews assist in supplying travel information to the public

Field employees provide key roadway information to the 511/ KanDrive systems to keep them up to date with the most current conditions. They also input important travel updates, like the message shown at right, on roadside message boards.



### *If you become stranded...*

- ♦ Do not panic.
- ♦ Stay in your vehicle.
- ♦ Circulate fresh air - run motor sparingly and open downwind window for ventilation.
- ♦ Call for help -
  - On Kansas highways, call \*47.
  - On the Turnpike, call \*582.
  - If you have difficulty reaching these, call 911.

**NOTE:** This information is available in alternative accessible formats. To obtain an alternative format, contact KDOT's Office of Public Affairs, Eisenhower State Office Building, 700 SW Harrison, 2nd Floor West, Topeka, KS 66603-3754, or (785) 296-3585 (Voice)/Hearing Impaired - 711.