INSTITUTE FOR HOMELAND SECURITY

Sam Houston State University

TRANSPORTATION AND LOGISTICS PROBLEMS EXPERIENCE DURING AND AFTER WINTER STORM URI:

PREPAREDNESS AND PLANNING LESSONS FOR THE PUBLIC AND PRIVATE SECTORS

Institute for Homeland Security

Sam Houston State University

David A. McEntire, PhD, SFHEA

Technical Paper #2

Abstract

Starting on February 11, 2021, a few major winter weather systems moved through Texas and wreaked havoc on transportation and logistics. Thousands of fender benders occurred due to icy roads and a major multi-vehicle pile up was experienced on I-35W in Fort Worth. People and even emergency workers found it impossible or difficult to go to work, school and run important, life-sustaining errands. Others chose to stay home based on government recommendations while transportation personnel plowed roads and tried to make them passable with the use of sand and salt. In spite of heroic efforts, emergency workers were often delayed in their efforts to meet 9/11 calls. Police, fire and EMS also faced major fuel shortages along with anyone else trying to operate a vehicle at the time. The combination of these factors and many others created serious supply chain issues. Public and private organizations must therefore do more to prepare for these types of events, and they must also work to increase their resilience in the areas of transportation and logistics.

Introduction and Overview

Texas does not consistently have bad weather in the wintertime, but when snow and ice storms occur, they can have severe impacts on transportation and logistics. For instance, traffic challenges were witnessed in December 2009 due to near-blizzard conditions with 40 to 50 mph winds. There were also major problems on the roads in February 2010 when record breaking snow was experienced in the Dallas-Fort Worth Metroplex. But none of the prior events compare to Winter Storm Uri, which took place in February 2021.

On Thursday, February 11th, 2021, the National Weather Service (NWS) issued a Winter Weather Advisory for much of Texas due to the arrival of sleet and freezing rain. A day later, the NWS provided a Winter Storm Watch in an anticipation of an Arctic front. Because snow was associated with this storm (3 to 6 inches of snow in the North and 1 inch of snow in the South), Texas Governor Gregg Abbott declared a state of emergency. By Sunday, the entire state was under a Winter Storm Warning, a Wind Chill Watch, and a Hard Freeze Watch. Temperatures dropped into the single digits. Even cities like Galveston, Houston, and College Station were affected by a hard freeze with temperatures recorded at 20°F, 13°F and 5°F in respectively.

Unfortunately, the situation continued to worsen over the next few days. More snow fell on Tuesday 16th through Thursday the 18th. Temperatures remained below freezing in many places for several days. According to the National Weather Service "there was a total of 8 days, 23 hours, and 23 minutes of severe winter highlights between the first Winter Weather Advisory issues on Thursday, February 11th at 9:37 am to when the last Hard Freeze Warning expired at 9:00 am on Saturday, February 20th" (National Weather Service n.d.).

While these extreme conditions caused major problems for power generation and the distribution of water, there were also significant impacts on the transportation system and

logistical operations. This report identifies those challenges and what can be done to better prepare for them in the future.

Problem Statement and Gap Assessment

A whole host of transportation and logistics problems resulted from the winter storm. They ranged from small fender benders and major pile ups to fuel shortages and shipment delays.

During the February 2021 winter storms, small fender-benders occurred non-stop throughout Texas. The snow and ice accumulations made driving extremely dangerous. In fact, the accidents were so frequent that the Texas Department of Insurance recorded 17,500 personal auto claims associated with Winter Storm Uri (Rickard 2022). The loss of power to traffic and streetlights did not help the situation either. One emergency management official in the area commented that they had "quite a few problems with accidents . . . because of traffic management facilities did not have power for extended periods of time."

There were also larger and more notable accidents, however. On the morning of Thursday, February 11th, a major multivehicle accident occurred on the Southbound lanes of I-35W near Northside Drive in Tarrant County. The pileup was the result of a combination of ice accumulation on the roads and excessive speed. The incident involved 135 vehicles (including several semitrailers) in a giant wreck that stretched over 1,100 feet. Six individuals tragically lost their lives in the crash and another 36 were injured. 60 tow trucks were required and worked around the clock to clean up the accident scene so the highway could be opened the following day.

Because of the frequency and severity of traffic accidents, local and state leaders encouraged people to stay home. In some cases, the request was a moot point. Many individuals could not leave their homes even if they wanted to. Their cars would get stuck in the driveway or as they tried to drive to work or run important errands (e.g., seek water and food).

In response to these transportation problems, government departments and private sector contractors did what they could to plow roads. Efforts were also made to spray roads with treatment or lay down sand and salt. However, the extent of snow and ice along with the duration of freezing temperatures made this a very difficult task. Plowed roads would quickly be covered with snow again and any melting ice would re-freeze at night. The

Meanwhile, first responders and those involved in logistics faced additional problems. As police, fire and EMS personnel responded to calls, they also got stuck, were involved in accidents, or slid off roads. Even if emergency workers were able to make it to their calls, they often arrived late because of the treacherous traffic conditions. Some government and private sector vehicle operators had tire chains that helped them with traction. However, the chains frequently broke and there were insufficient replacements to overcome the problem on an immediate basis.

Another major transportation problem related to fuel shortages, and this resulted from a variety of issues throughout the state which limited access to fuel. First, as many as 1,700 gas stations were closed and could not operate due to the loss of power. Second, the gas stations that were open ran out of fuel quickly because other suppliers were offline. Third, the replenishment of fuel at operating gas stations was significantly delayed because of the poor conditions of highways and roads throughout Texas. Even if vehicles had fuel, some became inoperable because diesel would gel up due to the extremely cold temperatures. Unfortunately, anti-gel additives were quickly depleted because the excessive demand at the time.

Supply issues were also problematic during this period and for a variety of reasons. Part of this was a result of the Covid-19 pandemic, which had already brought domestic and international manufacturing and distribution to a crawl. This, in combination with winter weather, poor road conditions and fuel shortages, also caused shipment delays on vital products and services. For instance, it was nearly impossible or very difficult to obtain food and water for people to sustain themselves when supplies ran out at local grocery stores. Generators were in high demand (along with fuel to run them) because of the loss of power to many neighborhoods and facilities. Chemicals (such as nitrogen) required to restart petrochemical plants could not be acquired due to high demand and a crippled transportation system.

In light of this dire situation, state and local governments along with many private sector entities did all they could to address the problems being encountered. As an example, the state purchased fuel and escorted it into Texas to help address the shortages that were prevalent at the time. Emergency personnel along with others operating snowplows, tow trucks and semi-trucks worked tirelessly to address traffic issues and re-establish supply lines. Regardless, Winter Storm Uri illustrated just how fragile the transportation and logistics sectors can be to these types of disruptions.

Topic Discussion

The scale and scope of transportation and logistics problems witnessed during and after Winter Storm Uri in Texas in February 2021 illustrate important lessons for public and private sector organizations alike. While some recommendations may be unlikely to implement due to cost/benefit ratios (e.g., having additional snowplows for storms that only occur a few times during the year), others can be employed by government agencies, large corporations, and small businesses to increase resilience in the face of serious contingencies. Several of them will be mentioned here:

- *Anticipate winter weather*. Recognize that governments and businesses in Texas are not just affected by hurricanes, tornadoes, severe thunderstorms, flooding, and extreme heat. Severe winter weather in the form of snow, ice and freezing temperatures is also possible and even likely throughout the state.

- *Create plans and procedures to better deal with severe winter weather*. Be sure to address policies about travel when snow and ice are present on roads and identify which workers are essential during these types of episodes.
- *Stock up on needed supplies*. This may include sand, salt, food, water, tire chains, fuel, anti-gel additives, generators, and other provisions to ensure operability when demand outstrips supply.
- *Pay close attention to weather forecasts*. Establish close relationships with National Weather Service personnel and local meteorologists to increase awareness of weather predictions and more quickly implement emergency protocols.
- *Recognize the interdependencies of weather, transportation, and logistics*. Consider how extreme winter weather may negatively affect traffic and your supply chain.
- *Communicate with suppliers and verify their ability to operate in times of scarcity*. Remember that your ability to function may be dependent on the capability of others to supply your needs in times of distress.

The major point is to increase readiness and resilience when winter storms threaten transportation and logistics.

The Way Forward

Winter Storm Uri, which occurred in February 2021, is a good reminder of the challenges that can be experienced due to snow, ice, cold temperatures. Government organizations and private sector entities need not be at the mercy of extreme winter weather. Proactive measures can be taken to anticipate and prepare for problems associated with transportation and logistics.

References

National Weather Service. (n.d.). Historic Winter Outbreak February 11-20, 2021. https://www.weather.gov/hgx/2021Valentinestorm

Rickard, Stacy. (2022). "Report: 500,000 + claims filed after Texas Winter Storm, $10.3 B Estimated Total Loss." Spectrum News 1. https://spectrumlocalnews.com/tx/south-texas-el-paso/news/2022/01/15/february-winter-storm-insurance-claims-at-500k

INSTITUTE FOR HOMELAND SECURITY

Sam Houston State University

The Institute for Homeland Security at Sam Houston State University is focused on building strategic partnerships between public and private organizations through education and applied research ventures in the critical infrastructure sectors of Transportation, Energy, Chemical, Healthcare, and Public Health.

The Institute is a center for strategic thought with the goal of contributing to the security, resilience, and business continuity of these sectors from a Texas Homeland Security perspective. This is accomplished by facilitating collaboration activities, offering education programs, and conducting research to enhance the skills of practitioners specific to natural and human caused Homeland Security events.

Institute for Homeland Security
Sam Houston State University

McEntire, D. A. (2022). **Transportation and Logistics Problems Experienced During and After Winter Storm Uri: Preparedness and Planning Lessons for the Public and Private Sectors** (Report No IHS/CR-2022-2033). The Sam Houston State University Institute for Homeland Security. https://ihsonline.org/Research/Technical-Papers/Transportation-and-Logistics-Problems-Experience-During-and-After-Winter-Storm-Uri