

Are Overpasses Safe in Tornadoes? By KI5LNM

This is in essence a part 2 of 3 parts dealing with tornadoes (if something else doesn't grab my attention). I know some of what is discussed in these probably have little chance to be problems here in Lee County, but definitely they can be in our neighboring counties. Tonight's training is information that needs disseminated. Since the 1970s false information has been passed around by the media, and we can help correct it.

After the 3 May 1999 tornado outbreak in Oklahoma a photo made the news purporting that Highway overpasses were safe places to take shelter from tornadoes. Some captions have even alluded that they are safer than your home. Since then many have fallen for this line of thought and have used overpasses to take shelter. This training will show that this is not true and why it is not true. My source is the NWS Norman Oklahoma website and will be linked in the post. There are pictures in the slides there of the spots I will be speaking about. I would suggest checking it out to see more clearly what the problems are that I will be talking about. You can find the information in other places as well.

One of the first known accounts of someone taking shelter under an overpass was 10 April 1979 in Wichita Falls, Texas. A man trapped in a traffic jam took refuge under the overpass and survived an F4 intensity tornado. There has also been video that seems to show how safe these overpasses are in storms as well as there is the instinct of man to want to hide in a covered area in severe storms.

What do we learn if we actually look at a video though that supposedly shows an overpass as a safe haven? In the Kansas Turnpike video from 26 April 1991. We find out that the tornado has run in open countryside with little debris flying about in it. It was given an F1 rating at the time it passed over the overpass. Though it was probably stronger as in the video you can see a van being rolled by it. Also the construction of the overpass shows that the people could crawl up into a ledge area that had places one could hold onto and not be blown out from under the overpass. But one can see also in the video that as the tornado passed over, the direction of the wind changed about 180 degrees in a matter of seconds. The people would be exposed to direct strong winds and flying debris at the time it hit them directly on.

Why is hiding in these overpasses dangerous?

1. Flying debris are missiles in the air. No matter the size of the tornado, it will have some debris that is the cause of most tornado casualties.
2. Wind channels under the overpass and this narrow area can cause wind speed to increase.
3. Wind speed can be near 0 at "True" ground level but is higher above ground level. The higher you climb up under an overpass, the higher the wind speed.
4. Many overpasses have no girders.
5. The wind does change direction almost 180 degrees as the vortex passes over. So on the one side of the overpass can protect you as the tornado approaches and then you get the full onslaught of wind and debris as the tornado moves away.

Now let's look at the 3 May 1999 tornado in central Oklahoma. It crossed over interstate highways 7 times. Three of those crossings were directly over overpasses where people were taking refuge. At each one of these there was a fatality.

Shields Boulevard overpass at Moore. This overpass had no girders yet at least 12 people parked their cars under the overpass which hindered all other cars behind them from getting through. They sheltered up under the overpass but there was really no protection from the

winds or debris flowing under it. Each person received severe injuries and one was blown away and found a week later under 6-8 feet of debris. These people put themselves in a severe dangerous situation as well as all the others that became trapped behind their cars.

The 16th Street Overpass at Bridge Creek had a very narrow ledge at the top underneath it and the girders were quite skinny. In after pictures, you can see metal debris imbedded in the bridge near where the people took shelter. This overpass took a direct hit so the winds coming under it changed direction about a 180 degrees. Some may have the idea of it being like a thunderstorm that has straight line winds. Not so with a tornado. Straight line winds is a different ball game altogether. Don't confuse the two.

The tornado also crossed an overpass near mile marker 176.5 on Interstate 35. This is considered officially a traffic death. But as we look at what happened we can see it started with the overpass. A man took refuge under the overpass but stayed in his car. As the tornado passed over the winds picked up the car and flipped it onto the embankment killing him. This overpass had no girders or support beams and was very smooth in construction.

So what is the reality of a tornado and overpass meeting? There are many misconceptions.

1. Some think that the wind always goes up and so if under an overpass you cannot be lifted up so are safe. This is very much not the truth of tornadoes.
2. Some think the winds connected with a tornado are only within the funnel that one sees. it does not extend beyond and so as the tornado passes over the bridge there is no wind under it. But we saw that this is fallacious when we looked at El Reno 2013 last time.

What we do know is the wind associated with a tornado is flowing horizontally around the funnel and reach to the ground, as a rule and can extend well outside of the funnel. Also not all tornadoes have a visible funnel often what you see is the wind whirling horizontally around the vortex with debris blowing around and around. Although there has been no specific studies of tornadoes and overpasses we can transfer knowledge of airflow around objects and apply it to this situation. The closer to the ground that the winds are, the slower they flow, and right at the ground they can reach 0 mph. This is the reason that you can be safer in a ditch or depression as opposed to up high under an overpass.

Next time will be part 3 where we will look at why in other weather events taking shelter under an overpass is still quite dangerous.

<https://www.weather.gov/oun/safety-overpass> Highway Overpasses as Tornado Shelters: Fallout from the 3 May 1999 Oklahoma/Kansas Violent Tornado Outbreak.

<https://www.groundzeroshelters.com/why-not-to-seek-shelter-under-overpasses/> This is a blog from a company that sells shelters. This page agrees with the NWS and has a video showing aftermath of cars under an overpass. It is nice and concise.