



The Dryline

The Official Newsletter of the National Weather Service in Amarillo

The Dryline - Summer 2013

Panhandle Summers are hot, and even hotter in the back seat.

Each year, dozens of children and untold numbers of pets left in parked vehicles die from hyperthermia. Hyperthermia is an acute condition that occurs when the body absorbs more heat than it can handle. Hyperthermia can occur even on a mild day. Studies have shown that the temperature inside a parked vehicle can rapidly rise to a dangerous level for children, pets and even adults. Leaving the windows slightly open does not significantly decrease the heating rate. The effects can be more severe on children because their bodies warm at a faster rate than adults.

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May 28, 2013 Severe Storms

On the afternoon of Tuesday, May 28, 2013 storms developed along a retreating dryline and an old frontal boundary. In addition to multiple reports of hail and strong winds with severe storms, there were four tornadoes (two EF-0 tornadoes in Beaver County, OK and two EF-0 tornadoes in Deaf Smith County, TX). Also, with dissipating showers, many locations, including Amarillo experienced strong non-thunderstorm winds. In fact, the highest recorded wind gusts of the day (78 mph in Perryton and 71 mph in Amarillo) were both not associated with thunderstorms.

Several funnel clouds were reported in and around the city of Amarillo shortly before midnight. In particular, a funnel cloud was reported west of the city limits at approximately 11:30 PM. Video evidence indicates this funnel lowered close to the ground. **However, there has been no physical evidence that the funnel came in contact with the ground.** The storm exited the city limits at approximately midnight after dropping large hail over portions of the city that caused damage to car dealerships and residential and commercial structures. The Amarillo Botanical Gardens suffered complete destruction due to hail up to the size of baseballs.

More information, including pictures, can be found at:

http://www.srh.noaa.gov/ama/?n=may_28_2013_severe_storms

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Damage Surveys

By Justyn Jackson, General Forecaster

When tornadoes occur, National Weather Service meteorologists are assigned the task of completing a thorough damage survey. A survey team's mission is to gather data in order to reconstruct a tornado's life cycle, including where it occurred, when and where it initially touched down and lifted (path length), its width, and its magnitude. It should also be mentioned that survey teams are occasionally tasked with determining whether damage may have been caused by straight line winds or a tornado and assessing the magnitude of straight line winds. With respect to tornado damage surveys, one of the most difficult tasks is assigning a rating to a tornado.

Before February 2007, tornado strength was rated based on the Fujita Scale. However, there were some flaws with the original Fujita Scale. For instance, it did not account for the quality of building construction. Beginning in 2001, it was determined that the Fujita Scale needed to be modified, and a committee of meteorologists, engineers, and academia was formed to begin developing a new scale. In February 2007, the new Enhanced Fujita Scale (Table 1) became operational and is still the scale used to rate the magnitude of tornadoes.

EF Number	3-Second Wind Gust (mph)
0	65-85
1	86-110
2	111-135
3	136-165
4	166-200
5	Over 200

Table 1. Enhanced Fujita Scale for rating tornado magnitude.

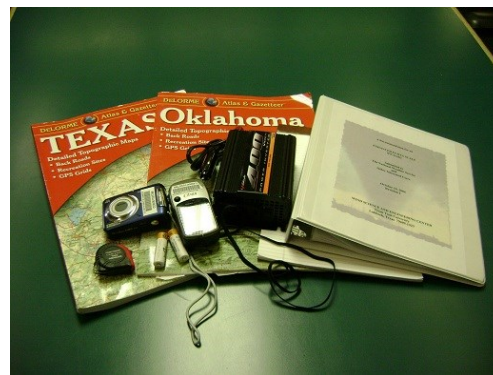
Before a survey team is deployed, they will be equipped with a variety of technology to complete the survey. Typically, a damage survey kit will contain a GPS unit, a cell phone, a laptop with damage survey software, a digital camera, an atlas or gazetteer, and a notebook. After a survey team is assigned and the survey kit is prepared, the team then drives to the reported tornado damage location(s). Most commonly, a survey team will conduct a full ground survey in order to assess tornado damage, but occasionally, a team may also conduct an aerial survey if the spatial extent of the damage is large enough.

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Damage Surveys continued...

Depending on the survey team, the starting and ending point of the tornado may be determined first followed by the width of the tornado. The time of the tornado's life cycle may be confirmed through eyewitness accounts and/or radar data. To determine the magnitude of the tornado, the survey team will attempt to find the worst damage since this is how the tornado will ultimately be rated. Once the worst damage is identified, the survey team will assign a damage indicator to the structure or object. There are 28 damage indicators, including one- or two-family residences, manufactured homes, motels, warehouses, schools, small retail buildings (e.g. fast food restaurants), and even trees. Each one of the damage indicators has a description of the typical construction for that category of indicator. For example, typical construction for one- and two-family residences includes asphalt shingles, tile, slate or metal roofing, attached single car garage, and brick veneer, wood panels, stucco, vinyl or metal siding.

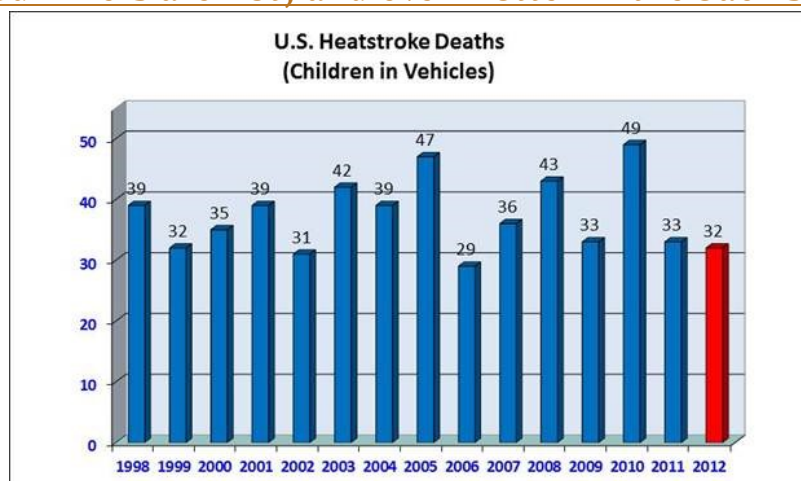
Once the structure or object has been assigned a damage indicator, the team will begin a thorough analysis of the building structure and construction. The survey team will then assign a degree of damage to the structure or object. The degree of damage has several different categories and each category has an expected wind speed and a lower and upper bound wind speed. For one- and two-family residences, if a tornado breaks glass in windows and doors, the expected wind speed is 96 mph, the lower bound wind speed is 79 mph, and the upper bound wind speed is 114 mph. If a tornado produces damage that results in the collapse of all interior and exterior walls, the expected wind speed is 170 mph, the lower bound wind speed is 142 mph, and the upper bound wind speed is 198 mph. This is where the job becomes dif-



An example of a damage survey kit used at the National Weather Service in Amarillo, TX.

icult for the survey team because the team must know some basics about construction. If the quality of construction meets strict building code, the survey team will likely assign an expected wind speed to the damage. If the construction fails to meet code, a lower bound wind speed may be assigned, but if the construction exceeds code and/or is well-engineered, it may be assigned an upper bound wind speed. Once the expected, lower bound, or upper bound wind speed is determined, it is applied to the EF Scale to assign a rating.

Panhandle Summers are hot, and even hotter in the back seat *continued.*



Courtesy of San Francisco State University.

The sun's shortwave radiation heats objects that it strikes. For example, a dark dashboard or seat can easily reach temperatures in the range of 180 to over 200°F. These objects (e.g., dashboard, steering wheel, child seat) heat the adjacent air by conduction and convection and also give off longwave radiation which is very efficient at warming the air trapped inside a vehicle. Hyperthermia deaths aren't confined to summer months. They also happen during the spring and fall. Below are some examples. [Learn more about excessive heat and cars.](#)

Vehicle Related Heat Deaths

- **Honolulu, HI, March 07, 2007:** A 3-year-old girl died when the father left her in a child seat for 1.5 hours while he visited friends in a Waikiki apartment building. The outside temperature was only **81 degrees**.
- **North Augusta, SC, April 2006:** A mother left her a 15-month-old son in a car. He was in a car for 9 hours while his mom went to work. She is now serving a 20-year prison sentence.
- **Greenville, TX, December 01, 2012:** A 6-month-old boy died after being left in a car for more than 2 hours by his mother. She was charged with murder. The temperature rose to an **unseasonably warm 81 degrees** on that day.
- **Adults are in danger too.** On July 12, 2001, a man died of heat stroke after falling asleep in his car with the windows rolled up in the parking lot of a supermarket in Hinds County, MS.

Safety Tips for Concerning Children

- **Make sure your child's safety seat and safety belt buckles aren't too hot** before securing your child in a safety restraint system, especially when your car has been parked in the heat.
- **Never leave your child** unattended in a vehicle, even with the windows down.
- **Teach children not to play** in, on, or around cars.
- **Always lock car doors and trunks--even at home--and keep keys out of children's reach.**
- **Always make sure all children have left the car** when you reach your destination. Don't leave sleeping infants in the car ever

Dual-polarization Radars now active across the nation!

Over the past several decades, [Doppler radar](#) has proved to be an invaluable tool to weather forecasters, allowing them to see inside storms to determine where precipitation — be it rain, snow, sleet or hail — is falling, as well as providing the ability to detect rotation in the atmosphere, thus providing important clues as to where tornadoes may be forming. In fact, Doppler radars are so good at detecting what's in the atmosphere that they detect other things such as birds and mosquitoes.

But that's becoming a thing of the past. Doppler radar technology has evolved, thanks to the dedicated work of NOAA researchers who developed dual-polarization, or dual-pol, technology, which will provide forecasters at each [National Weather Service forecast office around the country](#) with new, more-detailed images of what's happening in the sky, so they can better prepare those on the ground.

The [dual-pol upgrades](#) — completed in late April at every NWS-operated Doppler radar in the U.S., represent a NOAA-wide accomplishment. NOAA developed the technology through decades of research at the [Oceanic and Atmospheric Research's National Severe Storms Laboratory](#), while NWS and contractors designed, tested and installed the upgraded systems and organized timely and relevant training so that forecasters could effectively use the data and technicians could maintain the radars.



The radar receiving dish inside the protective cover. Dual-pol is both a hardware and software upgrade to the radar.

The dual-pol upgrade is the most significant enhancement made to the nation's radar network since Doppler radar was first installed in the early 1990s. Providing better information about the type of precipitation in the atmosphere and its intensity, size and location, dual-pol radars will increase the accuracy of forecasts and allow for more accurate and timely warnings, giving the public better information to protect their lives and property.

The first operational radar upgraded to dual-pol was at [Vance Air Force Base](#) near Enid, Okla., in March of 2011. NWS Amarillo received Dual-pol in November of 2011, and the final site, in Alaska, was completed this June. The dual-pol upgrade includes new software and a hardware attachment to the radar dish that sends and receives both horizontal and vertical pulses of energy, providing a much more informative two-dimensional picture. Conventional Doppler radars only send out a horizontal pulse of energy that gives forecasters a one-dimensional picture of whatever is in the air, precipitation or non-precipitation. It can see precipitation, but can't tell the difference between rain, snow, or hail. Dual-pol radar helps forecasters clearly identify rain, hail, snow or ice pellets, and other flying objects, improving forecasts for all types of weather.

Another important benefit: dual-pol more clearly detects airborne tornado debris — allowing forecasters to confirm a tornado is on the ground and causing damage so they can more confidently warn communities in its path. This is especially helpful in the dark when ground spotters are unable to see the tornado.



NATIONAL WEATHER SERVICE AMARILLO



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<http://www.srh.noaa.gov/CmsSrAdditions/smpanel/?sid=ama&embed=>



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