

= Tornado myths =

Tornado myths are incorrect beliefs about tornadoes , some of which are no longer held . These beliefs can be attributed to many factors , including stories and news reports told by people unfamiliar with tornadoes , sensationalism by news media , and the presentation of incorrect information in popular entertainment . Common myths cover various aspects of the tornado , and include ideas about tornado safety , the minimization of tornado damage , and false assumptions about the size , shape , power , and path of the tornado itself .

It is thought by some people that taking shelter under highway overpasses or in the southwest corner of the building provides extra protection from a tornado , but both of these probably increase the danger of injury or death . Some still believe that opening windows ahead of a tornado will reduce the damage from the storm , but this is not true . Some people also believe that escaping in a vehicle is the safest method of avoiding a tornado , but this could increase the danger in some situations . Other myths are that tornadoes can skip houses , always travel in a predictable direction , always extend visibly from the ground to the cloud , and increase in intensity with increasing width . Finally , some people believe that tornadoes only occur in North America , do not occur in winter , are attracted to trailer park homes , or that some areas are protected from tornadoes by rivers , mountains , valleys , tall buildings or other geographical or man @-@ made features ; the truth is that tornadoes can occur almost anywhere at any time if the conditions are right . Some geographic areas are simply more prone to these conditions than others .

= = Safety = =

= = Safest location in a building = = =

In 1887 , the first book on tornadoes was written by John Park Finley , a pioneer in the field of tornado research . While it was a revolutionary book containing many breakthrough ideas , it contained a few ideas which have since been proven false . One of these was the idea that the northeast or east part of a structure was the least safe , and should be avoided when seeking shelter from a tornado . This advice was unrefuted and heeded by many until the 1960s .

This myth was derived from two misconceptions : First , that tornadoes always travel in a northeasterly direction , and second , that debris from a structure will be carried away in the direction of the tornado 's propagation , leaving anyone taking shelter on the side of the structure facing the tornado 's approach unharmed . The seriousness of these misconceptions began to be revealed in the 1960s and 1970s , when surveys of major tornado damage in residential areas showed that the section of a house in the direction of the tornado 's approach is actually the least safe . Additionally , many tornadoes have traveled in directions other than northeasterly , including the Jarrell Tornado ( F5 on the Fujita scale ) , which moved south @-@ southwesterly . Because determining a tornado 's direction of approach can take time away from seeking shelter , official advice is to seek shelter in an interior room on the lowest floor of a building , under a staircase , I @-@ beam , or sturdy piece of furniture if possible .

= = = Opening windows to reduce tornado damage = = =

One of the oldest pieces of tornado folklore is the idea that tornadoes do most of their damage due to the lower atmospheric pressure at the center of a tornado , which causes the house to explode outward . As the theory goes , opening windows helps to equalize the pressure .

The source of this myth is from the appearance of some destroyed structures after violent tornadoes . When one wall receives the extreme pressure of tornado winds , it will likely collapse inward . This then leads to a considerable outward pressure on the three remaining walls , which fall outwards as the roof falls down , creating the impression of a house which has exploded . Indeed , damage surveys of " exploded " houses usually show at least one wall which has blown inward .

Additionally , if the roof is lifted before any walls fail , the walls can fall in any direction . If they fall outward , this structure can also appear to have exploded .

In even the most violent tornadoes , there is only a pressure drop of about 10 % , which is about 1 @. @ 4 pounds per square inch ( 9 @. @ 7 kPa ) . Not only can this difference be equalized in most structures in approximately three seconds , but if a significant pressure differential manages to form , the windows will break first , equalizing the pressure . Additionally , as the windows are the most fragile parts of a house , in a significant tornado flying debris will likely break enough windows to equalize any pressure difference fairly quickly . Regardless of any pressure drop , the direct effects of a tornado 's winds are enough to cause damage to a house in all but the weakest tornadoes .

Current advice is that opening windows in advance of a tornado wastes time that could be spent seeking shelter . Also , being near windows is very dangerous during a severe weather event , possibly exposing people to flying glass .

= = = Using highway overpasses as shelter = = =

The first documented instance of a person using a highway overpass for shelter from a tornado occurred in Wichita Falls , Texas on April 10 , 1979 . A man stuck in a traffic jam as the tornado approached left his vehicle and lay flat on an embankment beneath an overpass , surviving a violent tornado with only minor injuries . In 1991 , a highly publicized event occurred in which a television crew and several others survived the passage of a tornado near El Dorado , Kansas by huddling underneath an overpass , bracing themselves against steel girders . The sensational footage taken by the television crew was broadcast across the United States . This and other media coverage helped to fuel the myth that the underside of bridges or overpasses are good shelters when a tornado strikes .

However , in the El Dorado tornado , several unique factors came together to protect the film crew and others seeking shelter under the bridge . The tornado did not pass directly over the filmed bridge , but instead tracked slightly south of the area , exposing the people to winds less damaging than those in the tornado core . The overpass had an unusual design which included a hollow crawlspace at the top of the embankment , which was large enough to allow people to crawl inside and hold the exposed girders against the wind . This design also allowed for added protection against high @-@ speed debris .

These cases led to a false belief among many that highway overpasses were good shelter from a tornado . The belief was so strong among some that , in at least one case during the 1999 Oklahoma tornado outbreak , an individual left her well @-@ built home and drove several miles to seek shelter under an overpass , in the mistaken belief that she was safer there than inside her house . During the outbreak , a violent tornado directly struck three highway overpasses , and at each one there was a fatality . All of the individuals received significant injuries from tornadic debris , and several were swept into the tornado itself . By contrast , the same tornado struck approximately 2 @, @ 000 homes in Moore , Oklahoma , completely destroying many , yet resulting in only 3 fatalities .

From scientific lessons learned , especially in the wake of the 1999 Oklahoma outbreak , meteorologists insist that overpasses are insufficient shelter from tornado winds and debris , and may be the worst place to be during a violent tornado . The embankment under an overpass is higher than the surrounding terrain , and the wind speed increases with height . Additionally , the overpass design may create a " wind @-@ tunnel " effect under the span , further increasing the wind speed . Many overpasses are completely exposed underneath and most lack hanging girders or a crawlspace @-@ like area to provide sufficient protection from debris , which can travel at high speeds even in weak tornadoes . People stopping underneath overpasses block the flow of traffic , putting others in danger .

= = = Escaping a tornado in a vehicle = = =

Often people try to avoid or outrun a tornado in a vehicle . In theory , cars can travel faster than the

average tornado , and so it is better to avoid the tornado altogether than take shelter in its path . The official directive from the National Weather Service is for house @-@ dwellers in the path of a tornado to take shelter at home rather than risk an escape by vehicle . This is a result of several factors and statistics . An interior room inside a well @-@ built frame house ( especially one with a basement ) provides a reasonable degree of protection from all but the most violent tornadoes . Underground or above @-@ ground tornado shelters , as well as extremely strong structures such as bank vaults , offer almost complete protection . Cars , on the other hand , can be heavily damaged by even weak tornadoes , and in violent tornadoes they can be thrown large distances , even into buildings . High @-@ profile vehicles such as buses and tractor trailers are even more vulnerable to high winds .

There are many reasons to avoid cars when a tornado is imminent . Severe thunderstorms which produce tornadoes can produce flooding rains , hail , and strong winds far from the tornado @-@ producing area , all of which can make driving difficult or even impossible . Some tornadoes move faster than some cars ( record speed for a tornado moving across land is 72 @. @ 6 mph ( 116 @. @ 8 km / h ) ) , even when the road is clear and flat . Any of these situations can leave drivers stranded in the path of the tornado far from substantial shelter . When coupled with driver panic , they may also result in dangerous but preventable accidents . This situation would be magnified greatly if all the residents of a warned area left in their vehicles , which would cause traffic jams and accidents as the tornado approached . Numerous victims of the deadly Wichita Falls , Texas tornado on April 10 , 1979 died in their vehicles in such a situation .

If a person spots a nearby tornado while driving , the official National Weather Service directive has been for the individual to abandon the car and seek shelter in a ditch or culvert , or substantial shelter if nearby . Far @-@ away , highly visible tornadoes , however , can be successfully fled from at right angles ( 90 @-@ degrees ) from its direction of apparent movement . Despite dangers inherent with operating a vehicle during a tornado , given sufficient advance warning , mobile home residents have been instructed by the National Weather Service to drive to the nearest secure shelter during a warning .

= = Tornado behavior = =

= = = Tornadoes skipping houses = = =

Several different phenomena have lent credence to the idea that tornadoes " skip " houses , jumping over them like a girl with a skipping rope . Tornadoes vary in intensity along their path , sometimes drastically over a short period and distance . If a tornado was causing damage , then weakened to the point where it could cause no damage , followed by a re @-@ intensification , it would appear as if it skipped a section . Occasionally with violent tornadoes , a smaller subvortex within a tornado will completely destroy a structure next to another building which appears almost unscathed and thus apparently skipped over .

It is true that a house that is between two destroyed homes can be undamaged , but this is not the result of a tornado skipping , as some previously thought . After the 1974 Super Outbreak , Dr. Ted Fujita studied many films of tornadoes from that day . Included in his review was damage and tornado film footage of F4 and F5 tornadoes . Fujita concluded that multiple vortices , highly volatile tornadic satellites transiting within a parent tornado at high speeds , are responsible for making tornadoes appear to skip houses . The phenomenon of satellite tornadoes , where a smaller tornado orbits a larger companion tornado , can also lead to gaps in damage between the two tornadoes .

Weaker tornadoes , and at times even stronger tornadoes , can occasionally lift , meaning their circulation ceases to affect the ground . The result is an erratic and discontinuous linear damage path , leading to the term skipping tornado . These discontinuities tend to occur over areas larger than the small neighborhoods where the house @-@ skipping effect is observed , except possibly at the time of the birth and organization of the tornado . This situation is not commonly observed and the term is now rarely applied . Typically , when one tornado weakens and another forms , the

process of successive parent mesocyclones forming and decaying is known as cyclic tornadogenesis , thus leading to a series of tornadoes spawned by the same supercell . This series of tornadoes is known as a tornado family .

= = = Association of size with intensity = = =

Some people have been led to assume that small , skinny tornadoes are always weaker than large , wedge @-@ shaped tornadoes . There is an observed trend of wider tornadoes causing worse damage . It is unknown whether this is due to an actual tendency of tornado dynamics or an ability for the tornado to affect a larger area . However , this is not a reliable indicator of an individual tornado 's intensity . Some small , rope @-@ like tornadoes , traditionally thought of as weak , have been among the strongest in history . Since 1950 , more than 100 violent tornadoes ( F4 / EF4 or higher ) had a maximum width of 300 feet ( 91 m ) . Also , tornadoes typically change shape during the course of their lifespan , further complicating any attempt to classify how dangerous a tornado is as it is occurring .

= = = Appearing to reach the ground = = =

It is commonly and mistakenly thought that if the condensation funnel of a tornado does not reach the ground , then the tornado cannot cause substantial damage . This is another deadly myth . A tornado appears to be on the ground only when its condensation funnel descends to the surface , but this is misleading . The circular , violent surface winds , not the condensation funnel , are what both define the tornado and cause the tornado 's damage . Spotters should keep sight of swirling debris directly under any visible funnel or rotating wall cloud , even if such structures appear to not descend entirely to the ground . Additionally , tornadoes can be wrapped in rain and thus may not be visible at all .

= = = Direction of travel = = =

It has been thought in the past that tornadoes moved almost exclusively in a northeasterly direction . This is false , and a potentially deadly myth which can lead to a false sense of security , especially for unaware spotters or chasers . Although the majority of tornadoes move northeast , this is normally due to the motion of the storm , and tornadoes can arrive from any direction . The expectation of northeasterly travel may be accurate in many cases , but is no more than a statistical observation about tornadoes in general that any particular tornado may defy at any time . A deadly F5 tornado that hit the city of Jarrell , Texas in 1997 moved to the southwest - directly opposite of commonly expected storm motion . Additionally , tornadoes can shift without notice due to storm motion changes or effects on the tornado itself from factors such as its rear flank downdraft . This change of direction proved deadly in the 2013 El Reno , OK tornado in which a 2 @. @ 6 mile wide tornado shifted from an east direction to a northeast direction killing at least 4 storm chasers .

= = Geographical and temporal influences = =

= = = Geographical scope = = =

It is often thought that tornadoes only occur in North America . The majority of tornadoes do occur in the United States ; however , tornadoes have been observed on every continent except Antarctica .

Besides North America , Europe , Australia , the United Kingdom , western Russia , Bangladesh and the Philippines also experience tornadoes on a regular basis .

= = = Near rivers , valleys , mountains , or other terrain features = = =

There are many misconceptions involving the effect of terrain features ? bodies of water , mountains , valleys , and others ? on tornado formation and behavior . Most of these beliefs stem from the idea that tornadoes cannot cross or form near these terrain features . While most modes of tornadogenesis are poorly understood , no terrain feature can prevent the occurrence of a tornado .

Small bodies of water such as lakes and rivers are insignificant obstacles to tornadoes . Violent tornadoes have formed over rivers and lakes ? including the 1878 Wallingford tornado and the 1899 New Richmond tornado ? as well as crossing over them after forming elsewhere . More than a dozen tornadoes have crossed the Mississippi River in recorded history . Regarding mountains , tornadoes have been observed on terrain as high as 12 @, @ 000 feet ( 3 @, @ 700 m ) above sea level , and have been known to pass up a 3 @, @ 000 @-@ foot ( 910 m ) ridge unaffected .

These myths have been debunked in the past . The devastating Tri @-@ State Tornado crossed two major rivers along a record 219 @-@ mile ( 352 km ) or longer path . In 1944 , a violent tornado cut a continuous path at least 60 miles ( 97 km ) through heavily forested and mountainous territory in West Virginia , killing at least 100 people . A hill known as Burnett 's Mound on the southwest end of Topeka , Kansas was purported to protect the city from tornadoes , according to an old legend . However , in 1966 , an F5 tornado passed directly over the hill through downtown , killing 18 people and causing \$ 100 million ( 1966 USD ) in damage . Downtown Memphis , Tennessee was believed by residents to be protected from tornadoes and other severe weather by the Chickasaw Bluff along the Mississippi River . During the 1974 Super Outbreak , violent tornadoes crossed dozens of rivers , including the Ohio , Detroit River as well as crossing over mountains and ridges hundreds of feet high . Another example of tornadoes hitting mountainous regions of the United States is the April , 2011 " Super " outbreak , which hit mountainous parts of East Tennessee , Northeast Alabama , Southwest Virginia and North Georgia , killing many people , including an entire family of 4 in Ringgold , Georgia .

= = = Attraction to mobile homes and / or trailer parks = = =

The idea that manufactured housing units , or mobile homes , attract tornadoes has been around for decades . This may appear to be true at first from looking at tornado fatality statistics : from 2000 to 2008 , 539 people were killed by tornadoes in the US , with more than half ( 282 ) of those deaths in mobile homes . Only around 6 @. @ 8 % of homes in the US are " manufactured / mobile homes " .

However , it is highly unlikely that single @-@ story structures such as mobile homes can have a substantial effect on tornado development or evolution . More people are killed in trailer parks because mobile homes are less able to withstand high winds than permanent structures . Winds which can demolish or roll a mobile home may only cause roof damage to a typical one- or two @-@ family permanent residence . Another likely contributing factor to the continued propagation of this myth is confirmation bias : whenever a new instance of a tornado hitting a mobile home park occurs , media outlets report on it more extensively , ignoring damage to the surrounding area which may not have produced as many casualties .

= = = Downtown areas = = =

Some people believe that , for various reasons , large cities cannot be struck by tornadoes . More than 100 tornadoes have struck downtown areas of large cities in recorded history . Many cities have been struck twice or more , and a few ? including Lubbock , Texas ; St. Louis , Missouri ; Topeka , Kansas ; and London , England ? have been struck by violent tornadoes ( F4 or stronger ) .

Tornadoes may seem rare in downtown areas because downtown areas cover such a small geographical area . Considering the size of a central business district is very small compared to the city limits , tornadoes will strike outside of the downtown area more often .

The misconception , like most , has a small basis in truth . Research has been done in a few

metropolitan areas suggesting that the urban heat island effect may discourage the formation of weak tornadoes in city centers , due to turbulent warm air disrupting their formation . This does not apply to significant tornadoes , however , and it is possible that the presence of tall buildings may actually intensify storms which move into downtown areas .

= = = During winter = = =

Because they generally require warm weather to form , tornadoes are uncommon in winter in the mid @-@ latitudes . However , they can form , and tornadoes have even been known to travel over snow @-@ covered surfaces . Deadly tornadoes are no exception : from 2000 to 2008 , 135 of the 539 US tornado deaths occurred during meteorological winter ( December through February ) . Tornadoes in winter may be more dangerous , since they tend to move faster than tornadoes at other times of the year .