

Preliminary Report

on

TORNADO DAMAGE SURVEY OF THE WICHITA FALLS

AND

VERNON TEXAS TORNADOES

of

April 10, 1979

by

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On the afternoon of April 10, 1979 Northeast Texas and Southern Oklahoma were struck by an outbreak of several tornadoes. The two most severe ones hit Vernon and Wichita Falls, Texas. We first observed damage from the Vernon tornado 4 miles southwest of the Lockett community. It traveled through the Southeast edge of Vernon and crossed US 287 2 miles east of the downtown area. The storm is believed to have crossed the Red River and continued toward Holister and Lawton, Oklahoma. The Wichita Falls tornado cut a wide swath of damage through the southern half of the city. Damage was first observed when a major power transmission line to the city was cut two miles southwest of the football stadium. The tornado proceeded through the southern half of the city in an east-northeasterly direction devastating a heavily populated residential area. The path through the city was approximately one mile wide and 11 miles long. The last visible evidence of the path that we observed was five miles south of Petrolia, Texas.

The Institute for Disaster Research sent two, two-man teams to investigate the damage at Wichita Falls and Vernon. The first team departed Lubbock at 5:00 a.m. on April 11. They documented the damage in Vernon and then proceeded to Wichita Falls, arriving about 1:00 p.m. This team, made up of Dr. Joseph E. Minor and Dr. Richard Peterson, remained in Wichita Falls through Thursday April 12.

The second team consisting of Dr. Jim McDonald and Dr. Paul Gillett arrived in Wichita Falls late Wednesday night. Thursday morning was spent making aerial surveys of both Wichita Falls and

Vernon in a Cessna 172. This second team remained in Wichita Falls until Sunday night. The two teams took more than 1000 photographs of the damage.

Preliminary assessment of the damage by the Institute personnel rates the Wichita Falls tornado as an F4, based on "appearance" of damage. Comparison of the extent of damage with other tornado events, leads them to conclude that the maximum windspeeds were probably in the range of 175-225 mph. Evidence cited for these windspeed estimates include:

- (1) Residences and Apartment Complexes
Only the strongest walls on well-built residences remained standing. Upper floors of apartment buildings were blown away.
- (2) Engineered Structures
The football stadium, McNeil Jr. High School, Ben Milam Elementary School, Sikes Center shopping mall, and the Levi Strauss plant all suffered extensive damage.
- (3) Light Commercial Structures
Damage to Safeway store, Osborn's Department store, fast food restaurants and small individual businesses was devastating.
- (4) Pre-Engineered Metal and Tilt-Up Construction
Complete destruction of Sears warehouse, grain storage buildings, small manufacturing plant and paper goods warehouse was observed.
- (5) Mobile Homes
Candlewood Mobile Home park was totally destroyed.
- (6) Wind-Generated Missiles
Automobiles were tossed and tumbled as much as 200 yards. Steel roof trusses were transported one-half mile by the winds.

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The Vernon tornado is also rated F4 by the Institute team based on "appearance of damage". Maximum windspeeds are believed to be in the 150-200 mph range. Evidence for these preliminary windspeed estimates include:

- (1) Residential Damage
Only the strongest walls of residences remained standing.
- (2) Engineered Structures
Facilities of the Texas Highway Department were extensively damaged.
- (3) Light Commercial Buildings
A motel and restaurant on US 287 were leveled.
- (4) Generated Missiles
Several deaths in the Vernon tornado occurred because persons were caught in automobiles that were tossed and tumbled by the winds. Large tractors and other farm machinery were rolled and tumbled up to 100 yards.

The Institute tentatively plans to conduct a number of studies relating to these two tornado events. These studies include:

- (1) Near Ground Windfields
Plot the exact extent of damage, provide input for final F-scale rating of the tornadoes, study debris patterns that can be related to windfield characteristics, estimate windspeeds from structural calculations, determine percent damage by F-scale or windspeed within the Wichita Falls path.
- (2) Occupant Protection
Identify areas of safety for occupant protection in schools, churches, shopping centers and medical facilities, propose methods for occupant protection as the two cities rebuild.
- (3) Mobile Homes
Identify those mobile home units that performed the best in the storm, study anchor characteristics, identify those

units that had HUD identification numbers and compare their performance with older models (HUD models have more stringent structural design criteria).

(4) Missiles

Identify the various types of wind-generated missiles and determine their point of origin, correlate with trajectories predicted by computer models.

Research and reporting efforts by the Institute will be coordinated with Ted Fujita, University of Chicago, Bob Abbey, NRC, Charles Yancey, NBS, Roger Glass, Center for Disease Control, and personnel of the Texas Manufactured Home Federation. Copies of photographs and other documentation are available from the Institute for Disaster Research.

Support for this damage documentation effort is provided in part by the Nuclear Regulatory Commission (Contract NRC-04-76-345) and by the Institute for Disaster Research.