

**MOBILE/MANUFACTURED HOME
DAMAGE
ASSESSMENT FROM
A TORNADO THAT HIT
NEAR LARGO**



**Bureau of Mobile Home and RV Construction
Division of Motor Vehicles
Department of Highway Safety and Motor Vehicles**

July 22, 2005

**MOBILE/MANUFACTURED HOME DAMAGE ASSESSMENT
FROM A TORNADO
THAT HIT NEAR LARGO**

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NOTE: LIMITATIONS OF THE REPORT

The purpose of this report is strictly for the use of the Florida Department of Highway Safety and Motor Vehicles to determine the effectiveness of current department administrative rules governing the installation of mobile/manufactured homes.

All statistics reported here are from a sample of mobile home parks and areas visited. In addition, due to debris, entry into some areas was not possible to make more specific determinations. Consequently, the statistics reported here are estimates. There may be differences between what is reported here and determinations by local building departments, insurance companies or other government agencies

When reporting the number of homes "destroyed or non-repairable" the totals represent homes with severe roof damage to the point of the roof being blown from the home, one or more exterior walls being separated from the home or water completely penetrating the unit.



State of Florida
DEPARTMENT OF
HIGHWAY SAFETY AND MOTOR VEHICLES
TALLAHASSEE, FLORIDA 32399-0500

FRED O. DICKINSON
Executive Director

Date: July 22, 2005
To: Phil Bergelt, Program Manager
From: Wayne Jordan, Community Assistance Consultant
Subject: Manufactured Home study from tornado damage in Largo

A large severe thunderstorm occurred in the Largo area of Pinellas County late Wednesday afternoon, July 21st. The National Weather Service's Public Information Statement confirms that an F0 tornado was spawned that produced the damage in Largo. The Red Cross reports all mobile homes) 5 homes destroyed, 7 homes with major damage and 34 homes with minor damage and 5 homes affected (affected meaning something very minor). Our findings were similar, but the number of destroyed homes we found was only one. We did not have access to the insides of the homes to make further evaluations. The Largo building department may reduce the number of destroyed homes and list them as rebuildable after reviewing Florida Statutes 319 and 320.

Manufactured home installation was not a factor in this storm since none of the destroyed or damaged homes (or any other mobile homes) shifted on their foundations. Four parks with homes ranging from the 70s to late 90s were affected with only a scattering of newer homes. Carports, roof overs or site built attachments caused all the damage to mobile homes. These structures are always attached to the home and when they are destroyed (blown away) they peel part of the home's roof off. The rain is then allowed to penetrate the home. These structures are built to local codes and inspected by them. One home addition's roof was blown off taking the home's roof with it, then slammed into another home rolling into a third home causing its carport to collapse and blow away.

The local building code (now the Florida Building Code) has strengthened carports, but we still have many homes with lightweight carports, screened rooms and attachments that will not hold up to high wind forces.

One manufactured building (modular office trailer) adjacent to the Honeyvine Mobile Home Park was blown over. These units are installed to an engineered print and set-up by a general contractor. A quick study of the set up did reinforce the effectiveness of our program. Several installation techniques were observed that are no longer allowed by our program; too few

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anchors, strap that wrapped the I-beam, lack of radius clips and the use frame hooks. These items were recognized as a problem years ago and are no longer allowed in Department Rule 15C-1.

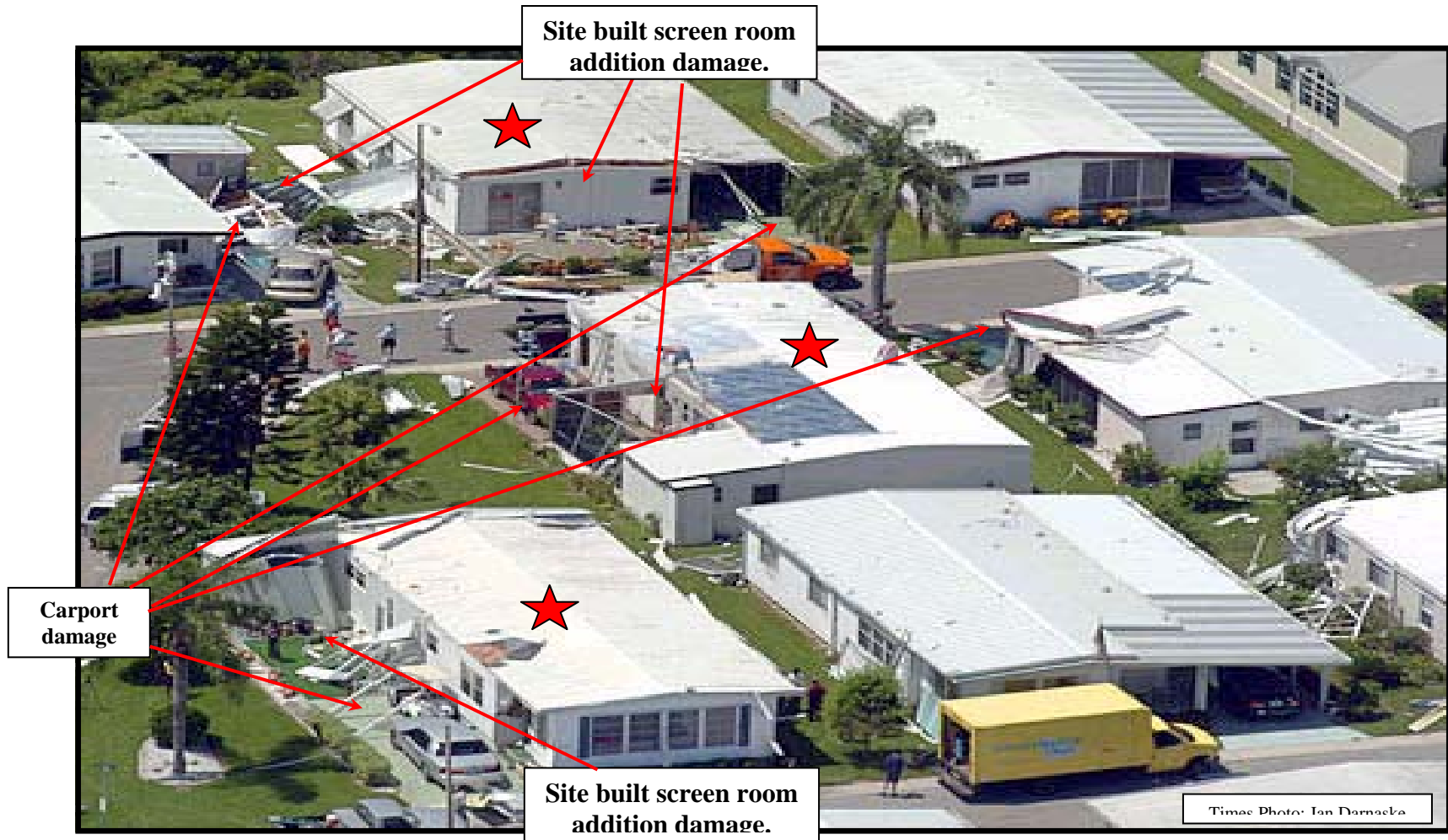
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**PHOTOS OF MOBILE/MANUFACTURED
HOME DAMAGE CAUSED BY THE
TORNADO THAT HIT LARGO**



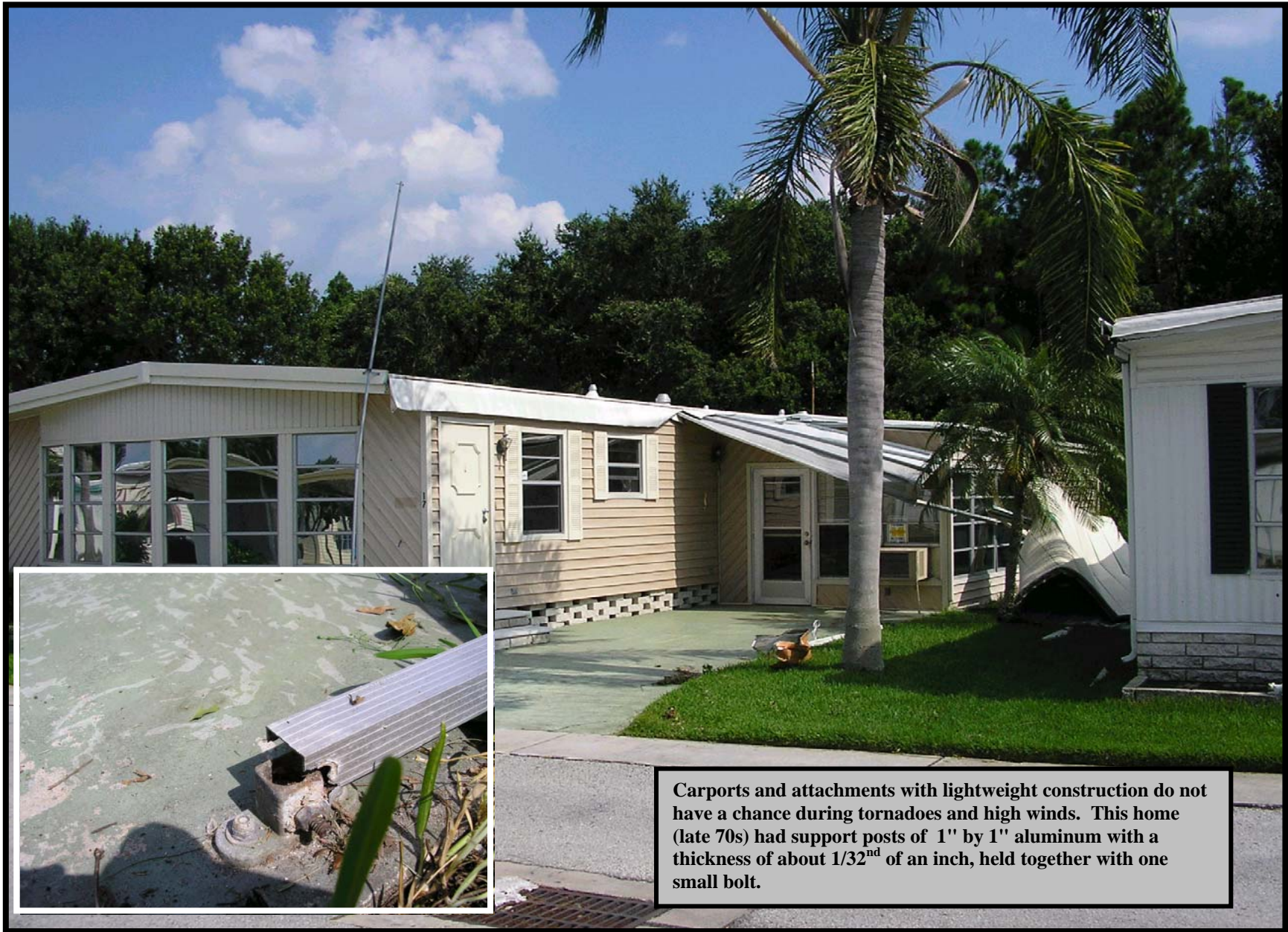
Newer home's installation performed well, but the storm's damage did not move, shift or turn over any home regardless of age. The home at the upper right is a newer home built in the late 90s and the remainder of homes were built in the 80s. The homes with the red star were classified as destroyed by the building department, but they may be reclassified as heavily damaged. Note how all the damage was caused by carports and screened room additions.



This home in the Town and Country Mobile Home Park lost its site built Florida room's roof, which then peeled off the mobile home's roof. The roof was blown across the street where it slammed into a second home and into a third home where it knocked off the carport and awning. None of these three older homes (70s – 80s) were moved on their foundations. All other damage was moderate in this park.



Roof rot caused the site built Florida room's roof to be blown into two other homes.



Carpports and attachments with lightweight construction do not have a chance during tornadoes and high winds. This home (late 70s) had support posts of 1" by 1" aluminum with a thickness of about 1/32nd of an inch, held together with one small bolt.



These homes almost lost their carports. This is a good illustration of how high wing forces affect a carport. After hitting the home the wind is deflected upwards. The home below is an 80s model and late 90s model in the inset.

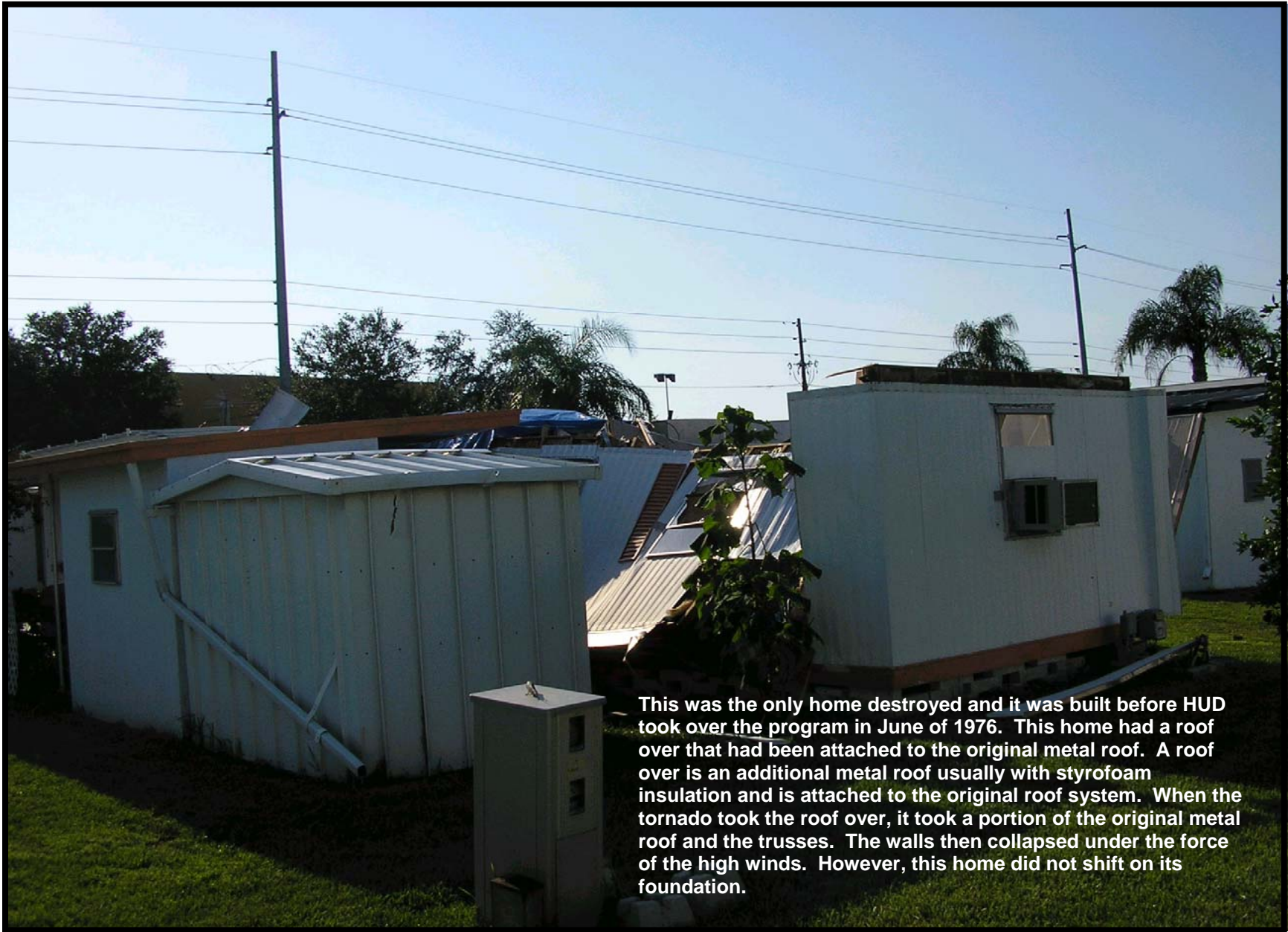




Two homes (80s models) that had the front screened rooms and carports heavily damaged. The homes did not shift off their foundation.



The home on the left had carport damage. The one on the right had a site built room, screened room and a carport damage. Seems repairable, but we do not know how the insurance company will settle. Neither home shifted on its foundation. Both homes were 80s models.



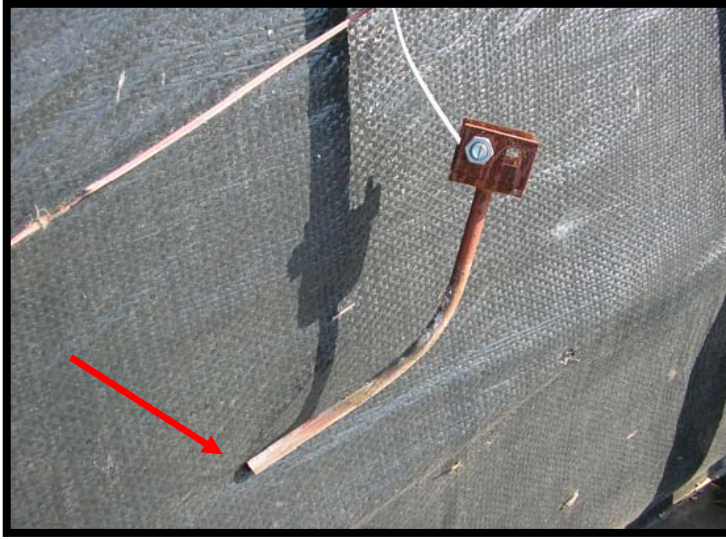
This was the only home destroyed and it was built before HUD took over the program in June of 1976. This home had a roof over that had been attached to the original metal roof. A roof over is an additional metal roof usually with styrofoam insulation and is attached to the original roof system. When the tornado took the roof over, it took a portion of the original metal roof and the trusses. The walls then collapsed under the force of the high winds. However, this home did not shift on its foundation.



1980s home that collapsed in the rear.



This modular office was flipped over by the tornado and slid to where it now rests. Several installation techniques were used on the installation of this unit that are not allowed by Department Rule 15C-1. The office was installed where the white dotted outline is shown.



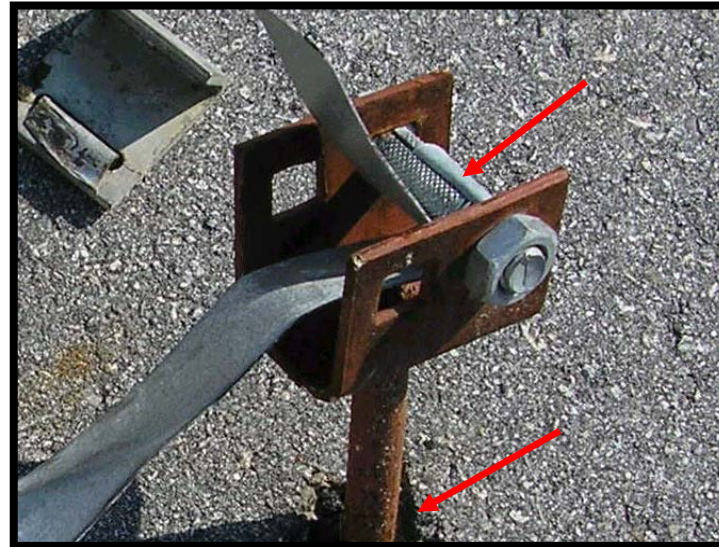
Too few anchors and they were cut off.



I-beam hooks were used and had no radius clips.



Straps wrap the I-beam causing breakage during tornadoes and high winds.



Anchors driven into asphalt parking lot and secured with too few revolutions of strap on the bolt.