



The National Institute for Occupational Safety and Health (NIOSH)

Promoting productive workplaces  
through safety and health research



# Mobile Home Assembly Line Worker is Electrocuted in Ohio

FACE 85-41

## Introduction:

The National Institute for Occupational Safety and Health (NIOSH), Division of Safety Research (DSR), is currently conducting the Fatal Accident Circumstances and Epidemiology (FACE) Project, which is focusing primarily upon selected electrical-related and confined space-related fatalities. By scientifically collecting data from a sample of fatal accidents, it will be possible to identify and rank factors that influence the risk of fatal injuries for selected employees.

A mobile home assembly line worker was electrocuted when he contacted the exterior of a mobile home that was electrified as a result of a short in the wiring of another mobile home on the assembly line.

## Contacts/Activities:

Officials of the Occupational Safety and Health Program for the Industrial Commission of Ohio notified DSR concerning this fatality and requested technical assistance. This case has been included in the FACE Project. On August 22, 1985, the DSR research team (two safety specialists and a fire protection engineer) conducted a site visit, met with employer representatives, interviewed comparison workers, and photographed the accident site.

## Overview of employer's Safety Program:

The victim was employed by a mobile home manufacturing firm that has been in operation for approximately 13 years. On the day of the incident, the firm employed approximately 95 laborers and 18 office personnel. This plant was one of eight such plants owned by the firm throughout the United States.

The production manager is responsible for safety on a collateral-duty basis. The company utilizes monthly safety meetings to promote safety awareness. Additionally, the company receives weekly safety topics from the Industrial commission of Ohio, which are used in the safety meetings.

## Synopsis of Events:

On August 13, 1985, four workers were in the process of installing the metal roof on a mobile home (designated home #1) in the metal roof station of the assembly line in the windows and door station (the next production station) another mobile home (designated home #2) had hot-to-ground short due to an exterior nail piercing the wiring in the wall of the mobile home. The power cord entering mobile home #2 did not have the ground wire connected to the electrical panel box of the home. The frame of home #2 became energized, because of the connection made by the nail piercing the wiring. The metal frame of home #1 was connected to the frame of home #2 by line-roll chains. This chain is used to move a the home between stations on the assembly line. Since home #1 had the metal siding in place, the complete exterior of the home became electrified. Four workers at the metal roof station were preparing to stretch the roof onto the frame of home #1, using a "come a long" attached to a steel post. One of the workers attached a vise-grip clamp to the edge of the metal roof, and as he grabbed the "come-a-long" to connect to the vise-grip clamp, he provided a path to ground for the energized home. The electricity traveled through his arms and upper chest. One his follow workers made an unsuccessful attempt to pull him away from the energized clamp, prior to disconnection of the electricity to home #2.

Electrical power (120 volts) is connected to mobile homes on the assembly line, after the electrical system has been installed, in order to use interior lights and electrical outlets during the remainder of assembly. In accordance with requirements in OSHA standards and the National Electrical Code, NFPA 70, a dielectric strength test of either 900 volts for one minute or 1080 volts for one second must be performed prior connecting electricity to the homes. The 1080 volt test was being used on the assembly line at the time of the incident. This test, performed prior to the incident, did not locate any shorts in home #2. In this case the hot-to-ground short (nail in the wiring) could have occurred after the test was performed, because exactly when the short occurred was never established; however, after the incident both voltage tests were performed on home #2 and only the 900 volt test located the short.

On the day of the incident, the environmental conditions were hot and humid and workers on the assembly line were very sweaty. These conditions may have contributed to the accident (i.e., moisture on the victim's body decreasing the electrical resistance of his body, thus creating a better electrical path to ground).

## Cause of Death:

The coroner determined that the cause of death was "electrocution due to 110 volts or less of electricity."

## Recommendations/Discussion:

**Recommendation #1: Employers should enforce existing regulations for grounding of mobile homes.**

**Discussion:** OSHA Standard 29 CFR 1910.309 and NFPA Standard 70, article 550, require that both electrical and nonelectrical metal parts in a mobile home be grounded. In this incident, the unconnected ground wire was a major contributing factor to the accident occurring. This led to the electrical short electrifying the exteriors of the mobile homes when power was connected. The accident may have been prevented if the mobile home had been properly grounded. Following this incident the firm designated one individual to make the electrical connection including the ground wire to the mobile home panel box and assigned a foreman to check the electrical connections before the home is connected to electrical power.

**Recommendation #2: Prior to connecting power to mobile homes, the wiring should be subjected to a one minute, 900 volt, dielectric strength test between live parts and the mobile home ground. This should be done after all exterior screws and/or nails are in place.**

**Discussion:** OSHA Standard 29 CFR 1910.309 and NFPA Standard 70, paragraph 550-10, require a dielectric strength test of either 900 volts for one minute or 1080 volts for one second. In this incident, the hot-to-ground short was detected by the 900 volt test, but not by the 1080 volt test. The accident may have been prevented if the 900 volt test was conducted prior to electrical power being connected to the mobile home. After the incident, the firm decided to use only the 900 volt dielectric strength test on all mobile homes prior to electrical power being connected.

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