



The National Institute for Occupational Safety and Health (NIOSH)

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# Worker Electrocuted at Power Substation in Howesville, West Virginia

FACE 85-01

## Introduction

The National Institute for Occupational Safety and Health (NIOSH), Division of Safety Research (DSR), is currently conducting a Fatal Accident Circumstances and Epidemiology (FACE) Program which is focusing on electrocutions. By scientifically collecting data from a sample of electrocutions, this study will identify and rank factors which increase the risk of electrocution for selected employees.

On September 18, 1984 at approximately 11:45 a.m., a 31-year-old employee was electrocuted while dismantling an abandoned electric substation tower.

## Contacts/Activities

On September 18, 1984, NIOSH was requested for technical assistance from the State Deputy Chief Medical Examiner.

On October 5, 1984, a research team, consisting of an epidemiologist and a safety engineer, conducted a site survey and interviewed the only other worker (brother of deceased) who was on-site the day of the fatality. Interviews were later held with the deceased's wife and the local sheriff's deputy who investigated the accident.

## Synopsis of Events

An electrical utility company had abandoned the substation and sold the unit to a private citizen. This individual sold the salvage rights to a third person who in turn contracted the demolition of the substation towers, which were of steel beam construction, to the deceased's brother. At mid-morning of September 18, 1984, the deceased and his brother arrived at the substation to begin demolition of the towers. The substation was secured by a perimeter security fence and locked entrance gate. Since the brothers were contracted to demolish the towers, they were provided with a key to allow access into the secured area. The brother stated that he had requested the utility company to de-energize the overhead powerlines when the tower was ready to be dropped to the ground (after the removal of all pertinent bolts) and they had agreed to do so. The brother also stated that he warned the victim that the powerlines were still energized.

The I towers were composed of columns, beams and joists which were bolted together at the connecting joints and also bolted at each column foundation base. (Refer to [Figure](#) for approximate configuration of the towers.) The towers were approximately 40' in height and were located directly beneath three distribution lines. These distribution lines were charged

with a potential of 69 KVA, each. The lines were approximately 6 feet above the tower.

In order to put the tower on the ground, the brothers planned to remove all but one of the bolts from each stabilizing joint. This would allow the frame to move downward as though it were hinged at each joint when a force was applied to it. Once the frame was on the ground it could easily be cut into manageable pieces.

On the day of the incident, the brothers were in the process of removing the connection bolts from the joints in two of the columns. Each brother was working on a separate column. They were working their way up the column from the ground using the column lattice work as an access system. The deceased, who was nearly 20 years younger than his brother, completed his column first. He asked his brother if he needed help. His brother gave a negative reply, telling him to go down and get a cup of coffee while he finished his column. Within a few moments the surviving brother heard a noise and saw his younger brother falling from the tower with his clothes ablaze. He descended the column and went to his brother's aid. A railroad engineer, who was passing by in a train at the time of the accident, stated that he "was attracted by a noise sounding like that made by an electronic bug whacker and a bright flash of light." This engineer then looked in the direction of the substation, saw the victim falling from the tower, and immediately called for emergency help.

The victim was transported to a nearby hospital where he was pronounced dead. Death was due to electrocution.

## General Conclusions and Recommendations

Based upon available information, it is surmised that the victim climbed from the column onto the top tower beam. He did this so he could walk over to help his brother remove the remaining bolts from that column. As the victim raised up into a standing position he either came in contact with or in near proximity to (approximately 1 inch)<sup>1</sup> the live 69 KVA line which was directly above the beam. This permitted sufficient electrical current to flow through his body to electrocute him.

Various factors contributed to the occurrence of this fatal accident. Some of these factors are:

1. The location of the steel tower in relation to overhead electrical power lines

The tower was immediately under three high voltage power lines which had not been moved when the substation was deactivated. The close proximity of the energized power lines to the tower (51-61) presented a reasonably foreseeable risk of contact when dismantling the tower.

2. The distribution lines were not disconnected or isolated from the entered production source nor insulated or guarded:

With the lines carrying a potential of 69 KVA, the risk of electrocution while working in the immediate vicinity of the lines is increased.

3. The insufficient level of hazard perception demonstrated by the victim:

Such a level may have resulted from lack of recognition of the danger, misjudgement of his ability to transverse the beam without approaching the line, inexperience around or lack of respect for electrical energy, incomprehension of the prior warning or insufficient warning, greater concern for the safety of his brother rather than himself, etc.

## Reference:

1. Bernstein T [1983]. Electrocution and Fires Involving 120/240 V Appliances. IEEE Transactions on Industry Applications, Vol. IA-19(2):155-159. (March-April 1983)

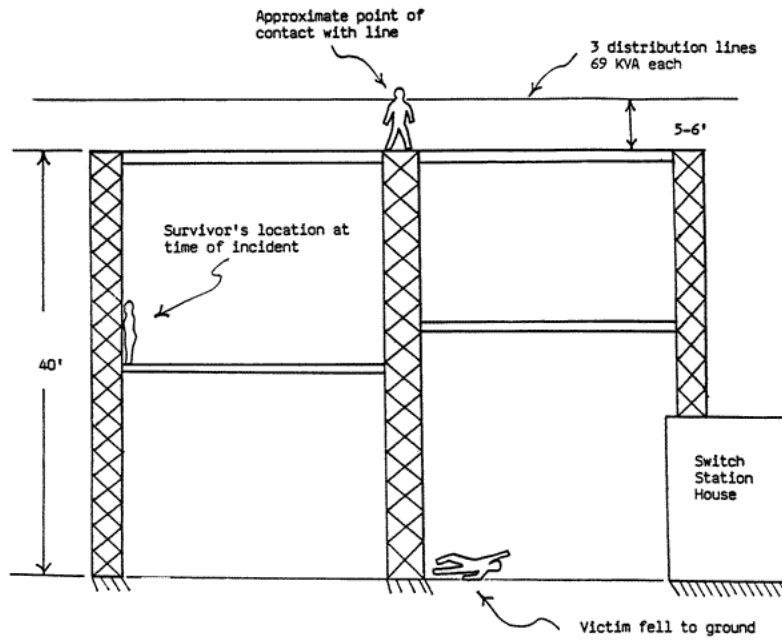


Figure.

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