DATE: October 29, 1993

FROM: Minnesota Fatality Assessment and Control Evaluation (MN FACE) Program
Minnesota Department of Health

SUBJECT: MN FACE Investigation 93MN00901
Construction Worker Dies from Heat Stroke

SUMMARY

A 31-year-old male concrete construction laborer (victim) died of heat stroke near the end of a hot summer work day. The temperature was 88 degrees on the day of the incident, about 6 degrees higher than average. Water was provided for workers on the construction site at all times. The victim had been pouring concrete sidewalks and curbs along a city roadway for about nine hours. The crew foreman instructed him to lay in the shade of a nearby tree after he complained of not feeling well; he rested in the shade for approximately ten minutes. When he got up to return to work saying that he felt all right, he began staggering, became incoherent, and was obviously unaware of his actions. Ice was applied to the victim's neck, and a passing police squad was flagged down. The victim's condition deteriorated rapidly, progressing to unconsciousness after ambulance personnel arrived. He was transported to a hospital, where he died about an hour later. MN FACE investigators concluded that, in order to prevent similar occurrences, the following guidelines should be followed:

> workers should be acclimatized to working in hot environmental conditions, especially when it is necessary for them to perform heavy physical labor; and

> scheduled rest periods should be provided for workers performing tasks in hot environmental conditions.

INTRODUCTION

MN FACE was notified of an August 11, 1993 construction fatality on August 16, 1993. MN OSHA, city police, and the county coroner's office were contacted and releasable information was taken. An employer interview was conducted September 13, 1993, via telephone. A site investigation was not conducted because the construction along a city roadway was completed.

The victim worked for a concrete construction company which had been sub-contracted to pour and curb city sidewalks. It employed 22 workers; the victim had been employed for eight days and worked at the incident site for two days. The victim was following standard operating procedures for his job at the time of the incident.

INVESTIGATION

A 31-year-old male laborer died of heat stroke near the end of a hot, summer work day. The temperature on the day of the incident was 88 degrees, 6 degrees higher than normal. He was part of a construction crew pouring concrete sidewalks and curbs on a city roadway. The job included tasks such as setting forms, shoveling gravel for grading purposes, and pouring and shoveling concrete. Drinking water was available on the job site for crew members throughout the day. The victim was observed drinking water on several occasions. Crew members took breaks as time permitted.

The victim had started work about 7:00 a.m. and showed no signs of illness until near the end of the work day, about 5:30 p.m. He complained to the crew foreman that he was hot and not feeling well. He was told to lay in the shade of a nearby tree, a request to which he complied. About ten minutes later the victim attempted to return to work. When questioned about his condition he responded that he felt all right, but was observed walking unsteadily and then began to visibly stagger. When instructed to rest further in the shade, he began mumbling incoherently and walked through some newly poured wet cement, unaware of what he was doing.

The victim became more unsteady and began to collapse. Coworkers helped the victim to remain upright and applied ice to his neck. A passing police squad was flagged down

and medical assistance was summoned. Emergency medical services personnel arrived about five minutes later, assisted the victim to the ground, and applied water and ice packs to the victim's body. He became progressively unresponsive and lapsed into unconsciousness. He was transported to a hospital where he died about an hour later.

CAUSE OF DEATH

The cause of death reported by the county coroner's office was heat stroke.

RECOMMENDATIONS/DISCUSSION

Recommendation #1: Workers should be acclimatized to working in hot environmental conditions, especially when it is necessary for them to perform heavy physical labor.

Discussion: Employers should be aware that worker physical fitness and acclimatization to hot environmental conditions affects their ability to perform in them. Acclimatization is the adaptation of a worker' body to a new environment. It allows the body to withstand additional physical stress a hot environment can impose on a worker. Acclimatization to heat involves a series of physiological and psychological adjustments that occur in an individual during the first weeks of exposure to hot environmental conditions. The victim involved in this incident may not have been fully acclimatized to performing heavy work in hot temperatures. Employers, in addition to providing drinking water to workers in hot environments, should carefully monitor the amount of time and the type of work their employees are exposed to in hot environmental conditions, especially when possibly unacclimatized individuals are involved.

Recommendation #2: Scheduled rest periods should be provided for workers performing tasks in hot environmental conditions.

Discussion: One method an employer can use to minimize worker exposure to heat stress conditions is to provide scheduled rest periods for workers exposed to hot environmental conditions. Standards are available through the American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values booklet; if adhered to, they ensure that the core body temperature for nearly all workers will not exceed 100.4 degrees, F. These standards assume acclimatized, physically fit workers, however, and caution must be used when applying them to unacclimated or physically

unfit workers. The ACGIH's scheduled work-rest regimens are based on a calculated temperature -- the wet bulb globe temperature. Equipment for the temperature measurements this index requires may not be readily available to employers, but in general they should encourage workers, when it is especially hot, to take several breaks during the work period.

REFERENCES

1. 1991-1992 Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices. ACGIH, Cincinnati, OH. 1991.

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