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|  <b>CITY OF<br/>TUCSON</b> | <b>City of Tucson</b><br>Central Safety Services<br>Number: SD-012<br>Subject: | Page 1 of 4                           |
|   |  | Effective Date:<br>January 17, 2007   |
|   | <b>Re-bar Caps</b>   | Reviewed/ Revised:<br>January 1, 2011 |

## **SAFETY DIRECTIVE**

### **PLEASE GIVE WIDE DISTRIBUTION TO AFFECTED EMPLOYEES**

#### **1.0 SCOPE**

OSHA Standard 1926.701 (b) Reinforcing steel - All protruding reinforcing steel, onto and into which employees could fall, shall be guarded to eliminate the hazard of impalement.

#### **2.0 PURPOSE OF SAFETY DIRECTIVE**

- a. To ensure effective compliance with OSHA Standard 1926.701(b) by all City of Tucson employees when guarding re-bar or reinforcing steel.
- b. To clarify the difference between re-bar (reinforcing steel) and a concrete Forming Stake.
- c. To clarify the need to effectively guard re-bar where re-bar is utilized in place of an industry recognized concrete Forming Stake.

#### **3.0 DEFINITION**

**Forming Stakes:** Metal stakes used to support concrete forms in the construction of sidewalks, concrete pads, street curbs or similar. Recognized by the concrete industry, forming stakes are made from rolled, hardened steel, with pre-drilled holes that will allow for nailing the concrete form to the stake and adjusting a concrete form to a specific height. The head of a concrete forming stake is normally and continuously blunted from repeated hammering.

**Re-bar:** Ribbed, soft steel used to strengthen poured concrete or provide additional strength to slump blocked walls or similar construction, sometimes called **Reinforcing Steel**. Re-bar or reinforcing steel is normally cut with a saw, torch or re-bar cutter, the result being the cut end is sharp and sometimes angled to a point.

**“Re-bar” cap:** A term applied to a method of protecting employees against possible impalement or serious injury by falling onto exposed steel in the form of re-bar or concrete Forming Stakes. Re-bar caps are normally manufactured from plastic material and are manufactured with high visibility orange or lime green coating.

#### **4.0 DIRECTIVE**

1. Beginning in January 2007, The Arizona Department of Occupational Safety and Health (ADOSH) has indicated that they will begin to strictly enforce

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OSHA Standard 1926.701 (b) regarding the protection or capping of re-bar/reinforced steel to avoid potential employee impalement. Additionally, letters of interpretation published by OSHA indicate that the traditional "Mushroom style" re-bar cap is not considered effective protection against impalement. Refer to excerpt below extracted from the OSHA Web Site

[http://www.osha.gov/SLTC/etools/construction/falls/protruding\\_rebars.html](http://www.osha.gov/SLTC/etools/construction/falls/protruding_rebars.html).

*"Tests designed by California OSHA were conducted that entailed dropping sand-filled canvas bags onto rebar protected by standard mushroom caps. Weights of the bags ranged from 140 to 160 pounds, and the bags were dropped from three, five and seven feet. The mushroom caps provided absolutely NO protection."*

*"Manufacturers of the mushroom caps agree that those caps were designed to provide SCRATCH PROTECTION ONLY and were never intended to prevent impalement, even at grade."*

*"Considering the serious nature of the hazard, the standard mushroom-style plastic rebar caps should not be used for protection against impalement. Protective devices capable of withstanding at least 250 pounds dropped from a height of ten feet should be used. Although there are no 'approved' mushroom caps on the market, steel reinforced covers and wooden troughs are available, and have been approved by California OSHA and recognized by the California AGC to meet the design criteria."*

Though the excerpt references CAL OSHA in testing and application, ADOSH will still cite to the Federal OSHA Standard based upon the recognition of the impalement hazard.

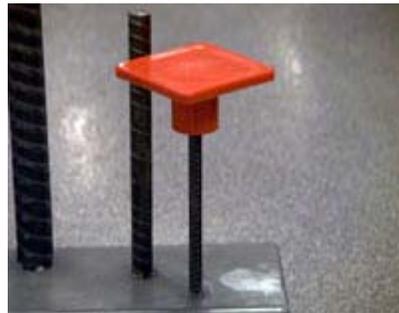
When "Mushroom Style" caps are placed on vertically installed re-bar at or below grade an employee has the potential to trip, fall and impact the Mushroom cap. Because re-bar is "soft" steel and is easily cut resulting in a sharp end, the re-bar will push through the plastic cap resulting in employee impalement or serious injury.



**Typical Example – Mushroom Re-bar Cap**

To fully comply with protecting City employees from potential impalement from re-bar installed at or below grade, or where employees may potentially fall onto rebar that is not capped with adequate protection, affected City departments shall take immediate steps to bring the City into full compliance and shall remove the “Mushroom Style” re-bar cap from use where employees are exposed to impalement and replace the re-bar cap with a more effective model, with integral reinforced steel construction.

**This includes the effective capping of re-bar where re-bar is utilized as a replacement for industry recognized concrete Forming Stakes.**



**Typical Example – Effective Re-bar Cap**

According to OSHA only rebar caps designed to provide impalement protection, such as those containing steel reinforcement, should be used.



**Accepted Practice – Bracing and covering exposed re-bar with lumber**

OSHA also gives an example of an effective alternative to impalement protection that allows for utilization of a commercially designed and available brace that will position a 2” x 4” or 2” x 6” piece of lumber directly over the exposed re-bar.

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**Note:** When re-bar is positioned in such a manner as to not pose an impalement hazard on the employee such as horizontal installation, or if the tip of the re-bar is high enough off the working surface (3'- 6') that the employee cannot fall onto the re-bar, such as during the construction of a wall, then "Mushroom style" caps may be utilized to protect the employee from scratches. If the employee constructing a wall elevates themselves into a position where they may fall onto the re-bar, then the mushroom caps must be replaced with an acceptable method of re-bar protection.

Departments shall also inform their contractors of the need to adequately protect re-bar in the examples listed above, in accordance with OSHA Standard 1926.701(b).

Departments shall also inform vendors that where re-bar is utilized as a replacement for industry recognized concrete forming stakes or any other means such as pipe support, temporary survey mark, etc. the re-bar shall be covered with effective caps or accepted practice coverings, installed in situations where employees (or civilians) may be subjected to potential impalement by falls, on City construction and remodel projects or right-of-way construction projects, such as sidewalk installation or repair and curb installation or repair.

**Additional Note:** When utilized in a City of Tucson application, concrete Forming Stakes shall be capped with a "Mushroom Style" cap or better. Concrete Forming Stakes shall be kept in good repair and discarded when the driving head splinters to a point beyond effective repair.