



Accident Investigation of a Crush Zone Incident – Tool Box Talk

DEPARTMENT: _____

DATE PRESENTED: ____/____/2009



Being caught in the Crush Zone has critically injured several New Jersey workers over the past few years. One example of this type of incident involved a worker who was seriously injured when the bucket from a backhoe fell from the arm and onto a worker. Accident investigators will describe how a series of little events came together to create the circumstances that lead to the injury. This phenomenon is often referred to as the 'Domino Theory.' In the accident investigation described below, identify as many dominoes as possible and how each could have been changed to prevent the worker getting injured.

It is the practice of several Public Works to use a backhoe or front end loader to drive posts into the ground. The process has one worker hold the post plumb under the raised bucket of the machine (see above photo). Several agencies investigated the incident. The following are several 'facts' that were discovered.

- The incident occurred at 1350. It was the first job after lunch break.
- The front end loader operator has many years of experience. The worker holding the pole was employed 18 months.
- Around lunchtime, a maintenance worker replaced the bucket on the unit after service. He was not experienced in the procedure but was able to make the connections (2 pins and hydraulic hoses) after several minutes. He reported shaking the bucket with no signs of improper connections. The machine was moved to another part of the yard.
- The machine was driven by the crew to the site without incident. Once at the site, the old post was pulled from the ground with the bucket. It was reported that no one noticed anything unusual with the bucket. The bucket was then used to push the new sign post in the ground. The first push was made without incident. The pole was repositioned for the final push. As the push was begun the bucket detached and fell on the worker under the bucket, in the Crush Zone.
- The mounting brackets on both the bucket and boom were intact. The connecting pins were intact.
- The operator did not visually confirm that the pins and brackets were locked in place. The driver did not leave the seat.
- There is an indicating locking switch on the dash that confirms the lock is in place, but, not necessarily the pins.
- The equipment manual contains this warning: "Improper attachment of an attachment could result in injury or death. Do not operate this machine until you have a position indication that coupler pins are fully engaged."
- The witness stated that he dragged the bucket across the ground prior to the start of the job to ensure that the bucket was attached. He did not observe any distortion to indicate a problem with the pin attachment.

Some contributing factors (or dominoes) might include:

- ☐ Having a departmental procedure that allowed for using the front-end loader for this purpose
- ☐ Having an inexperienced worker attaching the bucket
- ☐ After attaching bucket, not checking connection as per manufacturer instructions (only "shaken" to verify attachment).
- ☐ No visual confirmation of pin placement in the brackets
- ☐ Operator relying on dash indicating light, (commonly called idiot light)
- ☐ The experienced worker using the machine for a purpose that it was not intended for
- ☐ Having an inexperienced worker positioned within the Crush Zone
- ☐ Miscommunication (or lack of communication) between worker attaching the bucket and the crew using the machine, especially of the difficulty experienced in making switch

Employers should look at all accidents to determine root causes.