



# SHIFT BRIEFING



## BACKHOE CRUSH ZONE INJURY – CASE STUDY

One example of this type of crush zone injury 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 from 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 holding the post plumb under the raised bucket of the machine. Several agencies investigated the incident. The following are several ‘facts’ that were discovered:

- The incident occurred at about 1:30 pm. It was the first job after the lunch break.
- The loader operator has many years of experience. The worker holding the pole was employed for 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 signpost into 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 a locking switch indicator light 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 before 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.

*What factors from the story contributed to the accident and injury? (Help the crew identify the following factors)*

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

**This agency investigates injuries and we will hold employees accountable for participating.**