C14 Truck Unloading Caused Fatal Bunker Retaining Wall Tipover

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The goal of this presentation is to illustrate the investigations, measurements, testing and analysis, which determined the cause of a bunker wall overturning and resulted in a large settlement for the decedent's estate.

This presentation will impact the forensic community and/or humanity by demonstrating a methodology for analysis of unusual interactions of vehicles and structures, which may usefully be applied to other events of similar character.

A company in Molalla, Oregon, specialized in preparing and selling bagged bark dust and other soil amenities. The bulk bark dust was received from a single supplier, who delivered the bark dust in tractor-trailers. The bark dust was stored in open-top bunkers constructed of concrete blocks 2' x 2' x 6' with an interlocking tongue-and-groove which were stacked on the asphaltic concrete to provide the sidewall enclosure into which the trucks unloaded. The semitrailers had "walking floor" live bottoms for self-unloading. One of those bunkers was fairly close to a metal building on the property, and because there were no other sanitary facilities close by, there was a "Port-a-Potty" situated between the retaining wall of the bunker and the metal building.

The standard procedure was for the truck driver to back his truck up so that the trailer was about 6' from the wall of the bunker and then for him to wait for an observer from the processor's crew to stand by and watch the unloading and then to release the tailgate and release the brakes and begin the unloading process. The live bottom of the semitrailer would slowly move the bark dust cargo rearward, forcing the top-hinged tailgate open, and depositing the chips on the asphaltic paving in the bunker. Then, as the expelled cargo mounded behind the trailer, the tractor and semitrailer would be forced forward, allowing the mound to grow forward. At completion of unloading, the tractor-trailer would be driven forward to allow the tailgate to clear the mound and close.

The paper demonstrates a methodology for analysis of unusual interactions of vehicles and structures, which may usefully be applied to other events of similar character. On the occasion of the accident, a woman was in the Port-a-Potty; an observer from the processor's crew was not immediately available, and the truck driver decided to proceed with unloading anyway. As the unloading proceeded, the wall of the bunker tipped outward, partially crushing the Port-a-Potty against the building and exerting such pressure on the woman who was then standing that she was asphyxiated by compression of her chest and abdomen. The question was why the wall tipped.

Talbott Associates visited the site, measured the blocks of which the wall was formed, and measured the slope of the asphalt surface over which the tractor would have passed during its unloading. There was observed no foundation or soil failure. Next, the truck was examined at the supplier's yard, loaded in the manner and to the extent of the subject case. The slope of the drive on which the truck was situated was measured along its full length, and then with its brakes released, it was pulled by another truck while a dynamometer measured the force required to cause its motion. The trailer's top pivoting tailgate was measured, as were the general tractortrailer dimensions. Observation was made of concrete abrasion marks on parts of the trailer gate.

Samples of the different grades of bark dust were taken and were used to determine its density and coefficient of internal friction, shear strength, and its lateral pressure coefficient.

Because the bunker wall had been moved and replaced since the accident, no artifacts of the accident were discoverable on the wall itself.

Structural analysis of the stability of the concrete wall revealed that it had a huge factor of safety against overturning for retaining the bark dust and wood chips. Further analysis revealed that if the tailgate did not contact the wall, the force that could have been exerted through the chips could not have been enough to tip over the wall. Analysis also indicated that even if the tailgate had made contact with the wall, the geometry and mechanics of the unloading bark would provide a forward horizontal force on the trailer which exceeds the rearward horizontal force at the tailgate to wall contact. If the brakes of the tractor and trailer were released, the force required to move the trailer forward and thus the force applied to the wall was found to be insufficient to cause a tipover of the wall even with the combined effect of the lateral pressure of the chips against the wall. Therefore, the conclusions were that the trailer was stopped too close to the wall, the brakes were still applied, and the unloading proceeded without the driver watching the process and without the observer, which was required by the normal procedure.

A videotape of an unloading procedure taken by the Oregon Occupational Safety & Health

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Administration was reviewed, and computerized animations were performed to illustrate the process of the accident.

Suit was filed on behalf of the estate of the decedent woman, and after the defendants' counsel's viewing the animation and other evidence; a substantial offer in settlement was proffered and accepted.

Unloading, Wall, Tipover

