



Hanford Lessons Learned Man Lift Fatalities

Although this event has not been fully investigated, there are many facts that we can review and learn from to prevent a similar event at our facility.

Lesson Learned Summary

A double fatality occurred when a man lift toppled over at a construction site. The two men were operating a telescopic boom on uneven ground and had incorrectly positioned the Lift's counter weight on the downhill side of the slope.

Discussion of Activities

On October 10, 2008, two contractors were working on the east exterior façade utilizing the boom. The contractors began to reposition the boom uphill while standing on the platform with the arm extended, on an uneven slope, causing it to fall backwards, and resulting in the death of both individuals.

Moving the boom lift while the boom is extended is not recommended per the operating manual.

Local emergency responders arrived on the scene very quickly following an emergency 911 call. The Occupational Safety and Health Administration (OSHA) also arrived onsite and suspended work activities in the area of the accident while they conducted their initial investigation. Later that evening, OSHA cleared/released the accident area. Project operations were not restricted during the OSHA investigation for the non-affected work areas. However the project stood down for nearly a week after the accident to communicate the event and re-focus the workforce.

Analysis

At the time of the accident there were approximately 165 construction personnel working on site and over 232,000 construction hours had been worked without incident.

Robust construction safety orientation program and practices were in place throughout the duration of the expansion project.

Specifically, the two contractors had been through the contractor safety orientation where they also presented proof of training on generic lifts and booms, as required at the time.

As required both workers along with their supervisor, prepared and signed off on a pre work safety

plan the morning of the accident. Weather conditions were not a factor and were favorable for working. Both contractors were tied-off (harness & lanyard) while in the boom as required by applicable policies and operator manual.

Multiple, different contractors had used that telescopic boom for four months prior to the accident, in the same general area without incident. While this subcontractor (including the two workers) had worked on the project in other areas since June 2008, work for this particular crew in this area using that boom, began the day of the accident.



Contributing Factors

- ◆ **The work area where the boom was operating was not level** – Lifts/booms should only operate on a suitable, firm, level surface.
- ◆ **Counter weight and extension boom positioned improperly** – The contractors began to reposition the boom uphill while standing on the platform with the arm extended, on an uneven slope. The counter weight was located on the downhill side, shifting the center of gravity to the downhill side, causing it to flip backwards.
- ◆ **Training competence** – Current OSHA training requirements do not require proof of training on specific lift types. Evidence shows failure to operate lift within specific operational parameters.
- ◆ **Failure of tilt sensor and audible alarm** – The tilt sensor is specifically designed to alert the operator(s) in the lift basket, via audible alarm, when an unsafe condition (non-level working orientation) is being approached. The resulting OSHA investigation discovered that the Tilt Alarm had been disconnected, although when and by whom was never fully understood.
- ◆ **Pre-task Planning Effectiveness** – Existing contractor pre-task planning process was not robust enough to evaluate all tasks at an appropriate level of detail nor was that day's plan associated with the boom work completed in detail.

Occupational Safety and Health Administration Findings

- ◆ (5)(a)(1) General Duty Clause: Section 5(a)(1) of the Occupational Safety and Health Act of 1970: The employer (in this case, a sub-contractor on the job) did not furnish employment and a place of employment which were free from recognized hazards that were causing or likely to cause death or serious physical harm to employees in that employees were exposed to the hazard of falling: (a) Location - Job Site, Boom Lift: On or about 10/10/08, the employer did not ensure that the boom was not raised or extended unless the machine was on a firm, level surface. Among other methods, a feasible and useful method to abate this hazard is to ensure that the lift is level on a firm surface, using, if necessary, adequate pilings or other supports to ensure that the machine is level, as stated in the Operators Manual with Maintenance Information.

- ◆ 1926.21(b)(2) The employer shall instruct each employee in the recognition and avoidance of unsafe conditions and the regulations applicable to his work environment to control or eliminate any hazards or other exposure to illness or injury.
- ◆ 1926.453(b)(2)(i) Lift controls shall be tested each day prior to use to determine that such controls are in safe working condition.

Recommendations

- ◆ Only operate on suitable, firm and level surfaces
- ◆ Never operate drive system while boom in extended position
- ◆ Ensure Pre-Task planning accounts for all operating conditions and parameters related to the specific equipment being used
 - Includes review of equipment operations manual
 - Provides for pre-operation inspections, including safety systems integrity (e.g. tilt alarm is in proper working condition)
 - Incorporates review of specific site and area conditions
 - Ensures next, immediate user of borrowed equipment is responsible for its readiness for use
- ◆ Consider physical barriers to prevent boom lift movement in areas where unlevelled or unstable conditions are adjacent to planned work area
- ◆ Training should be specific to the type and model of equipment being utilized
- ◆ Robust maintenance and inventory program to ensure equipment is in appropriate working condition.

Information taken from the Hanford Lessons Learned/Operating Experience Information Bulletin 2009-RL-HNDF-0040