

Refinery Operator Fatality Caused by Improper Manlift Use

On July 21, 2006, at the BP Refinery in Texas City, Texas, a contractor pipefitter maneuvering a manlift basket was crushed between an I-beam structure and the manlift's control panel. The crushing injuries resulted in the pipefitter's death the following day. OSHA is still investigating the accident, but BP's internal investigation revealed that the pipefitter made numerous errors in maneuvering the manlift. (Reference: [DOE Lessons Learned](#) identifier 2006-RL-HNF-0041)

The injured pipefitter was part of a crew engaged in installing and welding structural steel piping for new flares. The work area was about 33 feet from the ground and was very congested with numerous obstacles. As Figure 1 shows, there were only a few inches of clearance between the top of the manlift basket (orange) and the 10-inch I-beam above. Because the I-beam was directly above the area where the manlift basket was positioned, the pipefitter was forced to lean over as he worked.



Figure 1. Manlift proximity to upper I-beam

Investigators discovered that the pipefitter was aware that he had chosen the least accessible path to get to the work area. They also determined that the manner in which the pipefitter was using the manlift violated OSHA requirements, manufacturer recommendations, and company policy. Section [453](#), *Aerial lifts*, of the OSHA Standard for Construction, 29 CFR 1926, requires employers to ensure that only authorized, trained employees operate aerial lifts and that manufacturer limits on boom and basket loads are not

exceeded. In this case, investigators uncovered evidence that the pipefitter had been operating the manlift improperly that day by setting the speed control to the highest level, circumventing the joystick's safety interlock, and applying a vertical force to the basket. None of these actions is permitted by the manufacturer.



Figure 2. Another view of the work area

In response to this unfortunate accident, BP Texas City revised its manlift operating procedure, hazard assessment form, and pre-use inspection record.

NIOSH reported another fatal [case](#) that occurred at a livestock feed manufacturing plant in Missouri in November 2005, where a 32-year-old career firefighter was killed when he was crushed between the manlift he was operating and a floor opening. The victim, who was wearing PPE, including a self-contained



Figure 3. Location of the fire and adjoining silo

breathing apparatus (SCBA), was instructed to search for fire-spread in an adjacent silo (see Figure 3). The firefighter had received only oral instructions on operating the manlift from a plant employee.

When the manlift stopped abruptly near the fourth-floor opening, the plant employee and fire captain assumed that the victim had reached the upper level of the silo; however, they were unable to maneuver the manlift

further. Another firefighter climbed a fixed ladder to the fourth level, where he discovered that the victim's SCBA had become wedged between the frame of the manlift and the fourth-floor opening, which was smaller than that of the other floors. Resuscitation attempts were unsuccessful. The ensuing investigation identified concerns in work planning, hazards identification, training, communication, and written procedures. The investigators recommended that the manufacturing plant clearly label any potentially hazardous areas.

The Office of Health, Safety and Security analyzed 50 events involving manlifts at DOE sites that bear some similarity to the two fatalities. As Figure 4 illustrates, the root cause of half of the events involved conduct of operations failures (i.e., inadequate understanding of hazards, errors in equipment selection, procedure violations, and errors in judgment). Nearly a third of the events involved poor work planning.

Root Causes of Selected Manlift Events Reported in ORPS

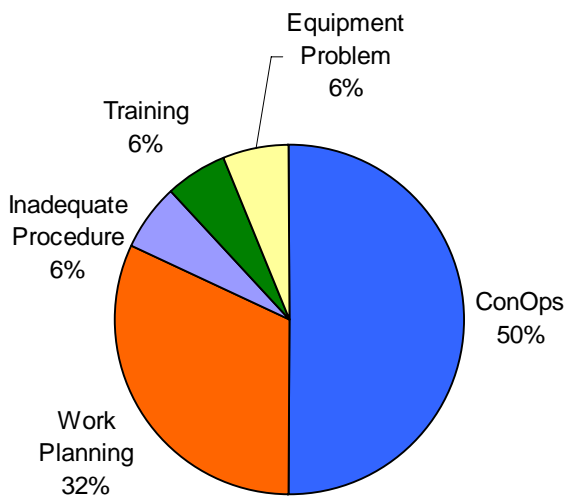


Figure 4. Root causes of selected DOE manlift events

Figure 5 demonstrates that of the 50 events analyzed, nearly half were near misses and 14 percent resulted in injuries. The most recent of these events occurred on June 26, 2006, at Los Alamos National Laboratory (LANL). A subcontractor mechanic and a teamster were unloading an electric manlift from a tilt trailer when the trailer suddenly toppled over. The mechanic, who was sitting in the manlift basket, bruised his

Event Results

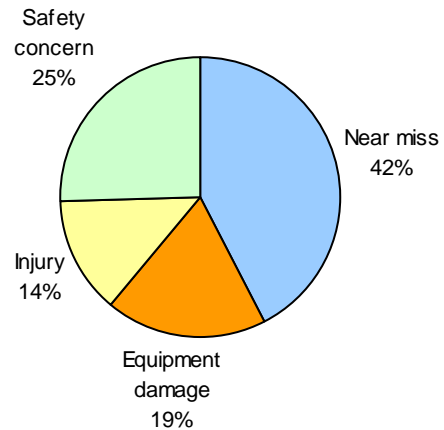


Figure 5. Outcome of analyzed events

upper right arm in the fall. The trailer was taken out of service until it could be inspected. Corrective actions from a previous similar event were inadequate and failed to prevent this accident. (ORPS Report [NA-LASO-LANL-ADOADMIN-2006-0008](#))

Investigators learned that the mechanic had noticed an anomaly in the trailer's operation, but did not stop work to report it, as required by Laboratory procedure. Interviews with other mechanics confirmed that they had also noticed irregularities when operating the trailer, but felt they were minor and neglected to report them. A thorough inspection of the trailer failed to disclose a mechanical deficiency, but investigators suspect that dirt or debris accumulated in the space between the bed frame and the trailer, impeding operation.

The previous similar event at LANL involved a worker who was seriously injured (severe leg laceration and sprained ankle) while operating a manlift. Investigators identified a deficiency in training individuals tasked with loading and unloading industrial equipment from trailers as a causal factor in that event. (ORPS Report [NA-LASO-LANL-ADOADMIN-2005-0001](#)) However, nearly 18 months later, the procedure governing loading and unloading heavy equipment from trailers still did not specify a formal training and qualification process. Although the victim in the most recent event received the training specified by the procedure, he had never unloaded industrial equipment from this type of trailer before.

The tragic accidents at BP Texas City and in Missouri illustrate the importance of thorough work planning, including inspecting work areas to gain a full



understanding of all potential hazards; ensuring that industrial equipment is in good working order and used according to the manufacturer's instruction; and ensuring that equipment operators are properly trained on the use of the equipment and understand its limitations. Industrial equipment should never be used in a manner for which it is not intended.

KEYWORDS: *Manlift, aerial lift, industrial operations, conduct of operations, near miss, injury*

ISM CORE FUNCTIONS: *Analyze the Hazards, Develop and Implement Hazard Controls, Perform Work within Controls*

