

## Workers Severely Injured Using Demolition Robots

Two construction workers were severely injured in separate incidents involving remote controlled-demolition machines also known as demolition robots. Workers operated similar machines with three-part articulating arms powered by electric-controlled hydraulics. Both used remote controllers intended to keep them outside the machine's risk zone, which varies by specific machine, attachment, and task.

### OPERATOR CRUSHED BETWEEN DEMOLITION ROBOT AND WALL

**Industry: Specialty Trade Contractors**

An operator was using a machine fitted with a shear attachment to demolish an HVAC system. He wore a waist-mounted remote controller connected to the machine by wire (Photo 1).

After he repositioned the machine, he had to move the power cable before lowering the outrigger. As he attempted to move the cable, he bumped the remote control against the machine. He had not put the machine into emergency stop mode, so it moved and pinned him between the outrigger and the wall. He tried to free himself but lost consciousness.

A coworker saw that he was pinned and slumped over the machine. The coworker tried using the remote control but the machine wouldn't move. Other workers then cut power to the machine and tried pushing it with a skid steer. After multiple attempts, they were able to rescue him. His chest was severely crushed causing him to be out of work for several months.

He had been with his employer six months and was reported to be an experienced operator of these machines. He usually worked with a partner but was alone at the time of the incident.

### OPERATOR'S FOOT CRUSHED UNDER OUTRIGGER

**Industry: Highway, Bridge, and Street Construction**

An operator was using a machine with a breaker attachment to chip concrete as part of a generator installation project. He stood in a tight spot between the excavation wall and the machine (Photo 2). As he tried to apply more pressure on the tip of the breaker, the front outrigger raised off the ground. The machine suddenly shifted forward and the outrigger came down, crushing his foot. He was able to use the remote control to raise the outrigger but suffered broken bones and nerve damage.

The employer conducted a job hazard analysis that identified the swing radius of the arm as a hazard, but did not recognize the potential of being crushed under an outrigger. The manufacturer's safety instructions warn to never stand where there is a risk of being crushed.

He had worked in construction for 23 years but had only operated the machine for five days. His training consisted of a hands-on demonstration and a brief review of the operator's manual.

### RECOMMENDATIONS

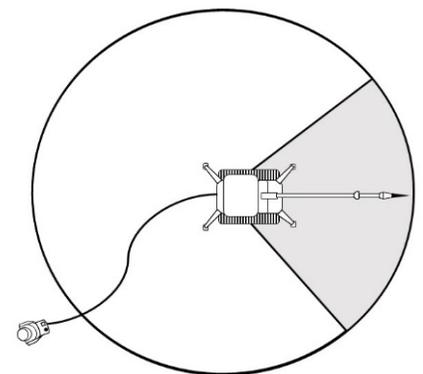
- Prepare a job hazard analysis with operators for each new job to identify and control hazards. Use the manufacturer's safety instructions to establish the risk zone for the specific machine, attachment, and task.
- Always stay outside the risk zone when the machine is in operation (Figure 1), and do not enter until the machine is put into emergency stop mode or deenergized.
- Consider using a proximity warning system, such as those based on radio frequency identification (RFID), to maintain a safe worker-to-machine distance.
- Train operators to manage power cables and to continually monitor the process for hazards and redefine the risk zone.
- Ensure operators always read and follow manufacturer's provided safety instructions.
- Consider using a spotter to assist the operator.



**Photo 1:** Remote control box with red emergency stop button.



**Photo 2:** Machine and approximate location of operator (Indicated by red "X").



**Figure 1:** Example of machine operating risk zone and remote operator position.