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SAFETY ALERT

10-S-11

CHIPPER FUEL TANK RUPTURES DURING WELDING

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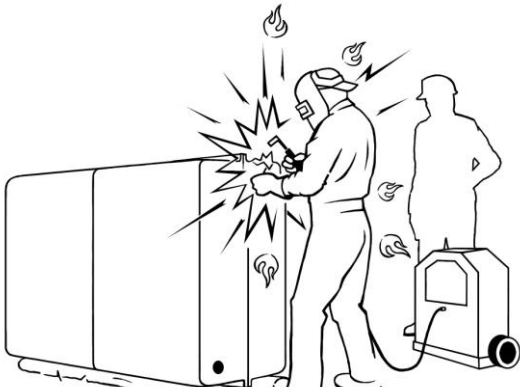
BACKGROUND: On a spring afternoon in the Southeast, a contract welder, assisted by a logging crew mechanic, was repairing cracks on a woods chipper frame. During the repair process, they noticed a fuel leak on the chipper's diesel fuel tank. After completing the repairs on the chipper frame, the welder and mechanic decided to repair the leak on the fuel tank. The 175-gallon tank was full of fuel, so they pumped fuel out of the tank and into the fuel truck that was on site. They used a crane (mounted on a service truck) to remove the tank from the chipper and set it on blocks for the repair. A pressure washer and fire extinguishers were located near the welding site.

PERSONAL CHARACTERISTICS: The welder and logging mechanic were both in their mid 30s. The welder was certified, with 10+ years of experience. Both individuals were wearing appropriate personal protective equipment.

UNSAFE ACT AND CONDITION: Before the welder started repairing the fuel tank crack, he inserted a hose attached to a carbon dioxide tank into the chipper fuel tank filler tube for 5-10 minutes. The carbon dioxide was supposed to purge fuel fumes from the tank. There were no clean-out ports on the fuel tank. The welder proceeded to start welding on the crack.



ACCIDENT: When the welder started to repair the crack with a stick welder, the tank's fuel vapors exploded, rupturing the tank at a welded seam and catching the welder's and mechanic's clothes on fire. The mechanic started the pressure washer and sprayed down the welder to extinguish the flames, after which the welder grabbed the wand and sprayed down the mechanic.

INJURIES: Other members of the logging crew transported the welder and the mechanic to a local hospital. The mechanic was treated for second-degree burns on one arm and shoulder and released. The welder was transferred to a burn center facility for treatment of third-degree burns on his chest and one arm. He remained in the hospital for almost 4 weeks.

RECOMMENDATIONS FOR CORRECTION: Welding on fuel tanks is risky. The investigation conducted after this incident showed that the welding contractor's tank-cleaning process was not adequate to remove fumes from the tank. Although the welder had used this procedure many times in the past, this time something went wrong. Two internal baffles in this chipper fuel tank may have prevented the CO_2 from spreading evenly through the tank, since the CO_2 hose was inserted into the opposite end of the tank from where the welding was conducted.

When possible, replace leaking fuel tanks or use non-welding techniques to repair leaks. If neither of those procedures is possible, the American Welding Society and other sources recommend the following procedures:

- Move the tank and/or equipment to a welding shop location with appropriate welding tools, as opposed to repairing in the field.
- If possible, steam clean the interior of the tank to remove residual fuel after draining.
- Purge the tank with inert gas prior to welding, and use a fume tester (sniffer) to determine safe exhaust gas levels during the purging/welding process.
- An alternative process is to fill the tank with water to within an inch of the welding site, and vent to release any steam build-up. It is also recommended to use a sniffer with this process.
- Always wear appropriate Personal Protective Equipment while welding.

Reviewed by:
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Please follow equipment manufacturers' recommendations for safe operation and maintenance procedures.