

THE HAZARDS OF HIGH PRESSURE FLUID INJECTION



What do you tell an employee when he/she is unable to earn a living because you didn't think fluid injection injuries could happen at your facility?



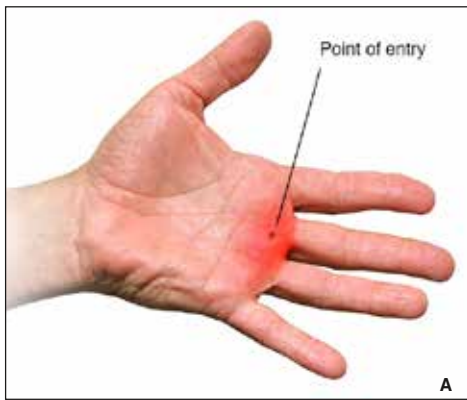
Mining, forestry, construction and agriculture are among a multitude of industries that use equipment outfitted with fluid power systems. These systems use hydraulic fluid, under very high pressure, to actuate various components to produce greater output. A vast amount of energy is contained within such systems, and the potential damage that the release of that energy can do cannot be overemphasized.

High pressure fluid injection injuries occur when hydraulic fluid is accidentally released from a fluid power system and comes

into contact with a worker. These types of injuries are usually devastating resulting in the loss of fingers, hands, eyes, arms...and even death.

Most people don't think about the disastrous results of injection injuries because they hear about them infrequently and/or have never experienced one firsthand. But injections can and do happen, even if safety systems are in place and maintenance workers are following established procedures to the letter.





Figures A and B show the innocuous appearance of a fluid injection wound with FluidSafe™ in the system and the extent of the surgery needed to treat it. Figure C shows the results of the invasive procedure caused by not knowing where the injection is actually located.

Life Imitates Art

A perfect example is Damien Martin, a contractor who worked at Peabody Energy's North Goonyella coal mine in Queensland Australia. On December 23, 2011, Martin was performing maintenance on the fluid power system associated with a roof support. He was replacing hydraulic hoses. As per procedure, the operations people isolated the two affected circuits and bled off the pressure. The replacement of the first hose took place without a hitch. Martin was told that the second circuit was also depressurized, and as a result started loosening the fitting.

Suddenly, the fitting separated and he was up against 6,500 psi of hydraulic fluid and an out of control hose. High pressure hydraulic fluid penetrated Martin's hand just below the palm. The thrashing hose broke his ulna.

As it turned out, a check valve was present in the line, but out of view. And the bleed valve had been replaced by a plug. The operations people thought the second hose had been depressurized, but it wasn't.

It Could Have Been Worse

Martin was immediately transported up to the surface of the mine. Fortunately,

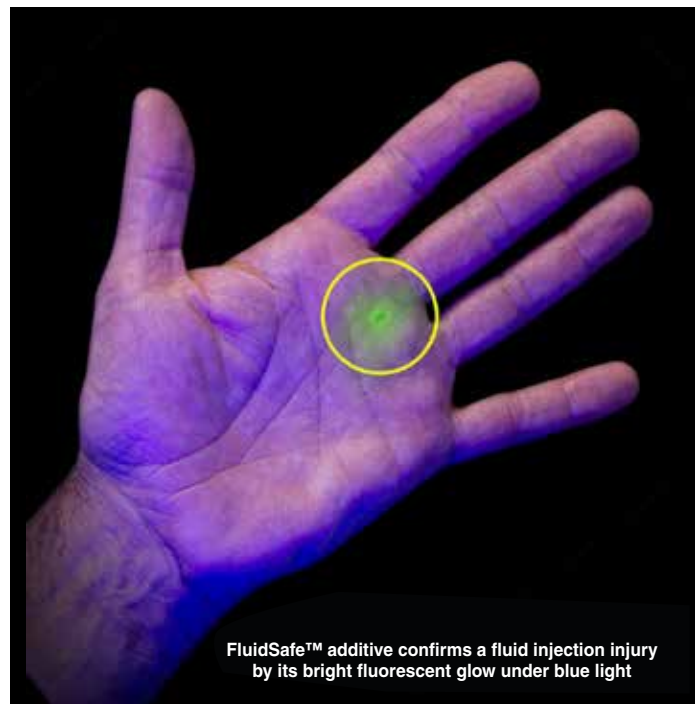
Peabody had begun using FluidSafe™, a unique additive that fluoresces under blue light to help confirm fluid injection and the degree of penetration under the skin. With FluidSafe in the system and the use of a blue light kit, onsite first aid staff were able to confirm the injection of hydraulic fluid. He was transported to a local hospital along with the blue light kit and instructions for the emergency room physician. The wound boundaries were easily observable with the blue light, thanks to the presence of the fluorescent additive. This allowed the doctor to carry out surgery on Martin's hand in a manner that minimized tissue loss.

On December 24th, Martin underwent further surgery at a hospital in Sydney, where his smashed ulna was set and repaired. After his discharge on December 27th, he had six months of recovery and rehabilitation. But in the end, due to the quick action by onsite responders and capable surgeons, and aided by FluidSafe and a

blue light inspection kit, Martin regained 95% functionality in his hand.

Despite his ordeal, Martin feels blessed thanks to the forward thinkers at Peabody Energy.

"I've known people who've lost fingers and hands from high pressure fluid injection injuries. I consider myself very fortunate to have worked for a company that proactively decided to use FluidSafe."



FluidSafe™ additive confirms a fluid injection injury by its bright fluorescent glow under blue light

Time to Rethink Safety

Maintenance personnel who work on heavy equipment are outfitted with hardhats, steel-toed boots, gloves and safety glasses - all precautionary measures against

accidents. Isn't it time to think proactively about fluid power system safety, as well?

Even though regulations are in place and proper procedures should be followed when running these systems, installation and operational failures do occur. Considering

the magnitude of the consequences associated with these failures, instituting simple, proactive, cost-effective measures against accidental fluid injection injuries is a win-win proposition for all.



FluidSafe™ WHAT IS FluidSafe?

FluidSafe™ fluorescent additive, a Spectroline® product, is a revolutionary formula that aids in the detection and surgical removal of hydraulic fluid in the event of an accidental high pressure fluid injection.

This not only allows triage of cases not requiring surgery, but also helps pinpoint the exact location of hydraulic fluid under the skin, assisting in limiting soft tissue dissection. Furthermore, the stabilizing agent in FluidSafe will allow the green fluorescence to remain visible in the tissue for 24 hours after the injection, with no ill effects to the human body.

Perhaps, just as importantly, FluidSafe helps detect leaks in hydraulic hoses, fittings, seals and other components before they have degenerated to the point where their safety and integrity have been compromised. Undetected leaks result in costly fluid replacement, equipment breakdown, lost production volume, liabilities associated with environmental contamination...and, inevitably, increase the risk of injection injuries.



Leak detected using a blue light inspection lamp after the addition of FluidSafe™ additive to the hydraulic fluid system.



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