

Hydraulic injection injury

Health and Safety Executive - Safety Alert	
Department Name:	Field Operations Directorate - Product Safety Group
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Target Audience:	Hydraulics engineers, Construction Quarrying and tunnelling Engineering Maintenance and Service personnel
Key Issues:	A maintenance fitter died from hydraulic injection injury sustained whilst tensioning the track of a piling rig. The grease nipple became detached from the track mechanism permitting the release of grease under high pressure. This alert reminds the target audience of the potential for such injury when working on any hydraulic machinery.

Introduction:

The purpose of this safety alert is to raise awareness of the risks from hydraulic injection injury. Initial findings from an HSE investigation has found that whilst a maintenance fitter was using a hand powered grease gun to tension the track of a piling rig, the nipple connecting the grease gun to the track mechanism detached, permitting the grease (under significant stored energy) to release, injecting the fitter.

Background:

Hydraulic injection injury occurs when the outer layer of skin is broken by a jet of fluid under pressure. Although serious reported instances of hydraulic injection have occurred at pressures

over 100 bar (1450 psi), anecdotal evidence suggests hydraulic injection injury may occur at pressures as low as 7 bar (101.5psi) [1].

Injection injury often results from a failure of a component in the mechanical system. This can result in the equipment remaining in use and pressurised whilst leaking fluid. [2]).

A person may come in to contact with a fluid jet while using equipment or when carrying out inspection and/ or maintenance prompted by a reduction in performance of the equipment.

This can cause harm in two ways:

- The mechanical pressurised penetration and subsequent trauma to the surrounding and underlying tissue
- The toxicity of the fluid injected into the injured party

The severity of the injury varies according to the following:

- Pressure
- Proximity
- Jet size

Following any injection injury, prompt action is essential to save the injured persons limb, or even life. Without medical treatment, after four – six hours the victim may experience intense throbbing pain that is unresponsive to pain medication. Without proper care injection injuries can lead to amputation of affected parts.

Action required:

Anyone maintaining mechanical plant should inspect the integrity and security of grease nipples and pipe work adapters used as part of track tensioning systems. This should take place at routine service intervals and before attempting to carry out vehicle track tensioning at any time.

Where replacement or maintenance takes place on a pressurised system, fittings should be matched and compatible as per the original equipment manufacturers specification. Verification of such replacement should be regarded as a pressure test and appropriate precautions taken [3].

Personnel should be familiar with the steps to take, if injection injury occurs, particularly the need to seek immediate professional medical treatment [4].

References:

[1] Hydraulic injection – [HSL research report – RR976](#)

[2] BS EN ISO 4413 (2011): International Standards Organisation - Hydraulic fluid power –
General rules relating to systems

[3] Safety in pressure testing – [HSE guidance note GS4](#)

[4] Fluid Injection injury emergency – The facts – British Fluid Power Association

Further information:

Awareness to a previous reported incident is available at: [safequarry.com](#) .

General note:

Please pass this information to anyone involved in hydraulics engineering or general maintenance technicians.

[Additional note not part of the published safety alert - the [safequarry.com](#)  link listed above illustrates the level of surgery that may be required to resolve an apparent 'pin prick' injection injury - accurate briefing of medical staff and early treatment is essential.]