

Learning Point

Buxton Lime and Cement

Contractor major injury as a result of a high pressure fluid injection

What happened:

A bolt tensioner pressurised to 2000bar suddenly discharged hydraulic fluid that injected into the armpit of a contractor using the equipment on a cement mill gearbox.

The equipment:

The hand operated pump feeds high pressure hydraulic fluid via a reinforced hose to the bolt tensioner. The bolt tensioner is attached to the stud thread which it stretches by up to 3mm allowing the securing nut to be released. The tensioner was manufactured by AS Tech Industrie - und Spannhydraulik GmbH of Leopold-Hoesch-Straße 5-7, D-52511 Geilenkirchen, to fit M56 threaded studs.

Incident cause:

The primary cause of the incident was that the bolt tensioner had been previously over extended. The yellow band indicates the maximum extension of the inner ram, and this had been exceeded whilst in use. Over extending the unit can result in the seal, which is completely concealed, failing to function correctly. Normally seepage of hydraulic fluid would be expected; however, as occurred in this case a sudden high pressure fluid discharge can occur with potentially serious injuries. The jet discharged between the inner and outer parts of the unit.

Key learning points:

- Over extending the inner ram (which may be indicated by a yellow band – as in this incident) or a red band can result in loss of an effective seal.
- Over extension followed by subsequent retraction of the unit may affect the seal, but this will not be obvious from an external examination.
- When in use the inner ram **must** be completely wound back so that the indicator band is fully retracted, failure to do so is likely to result in over extension whilst in use.
- The operator must be fully conversant with the limitations of this type of bolt tensioner as the action of the user is critical to the safe use of the equipment.
- The maximum extension of the inner ram should be specified by the manufacturer; in this case it was 8mm, it essential that this is not exceeded.
- Bolt tensioners manufactured since about 2007 have a fail safe pressure relief system fitted that prevents over extension of the inner ram.

