

Safety alert

Mines Inspectorate

Safety alert no. 243 (Version 1)
8 July 2010

Injury while working on Jaw Crusher Spring Assembly

Mine Type: All Mine Types

Incident: A third year apprentice, assisting in the adjustment of the discharge opening of a mobile jaw crusher, was unscrewing the retaining nut on the drawback tension rod and spring assembly when the rod failed catastrophically. This caused the components to fly out with force, striking him on the shoulder, and causing severe bruising and soft tissue injury.

Equipment: Terex Pegson Premiertrak 100x800 mobile jaw crusher.

Hazard: Working on compressed spring assemblies.

Cause: Sudden release of potential energy stored in the spring due to a fracture of the drawback tension rod.

Comments:

- In this design, the primary control against the risk of injury from a failure of a drawback tension rod is a U-shaped guard, installed to contain flying components. This guard had been removed while the spring remained in compression.
- Initial investigation indicates a possible pre-existing fatigue fracture at the point of failure, which is a potential risk in an application where the rods are subjected to cyclic loading patterns.
- The guard was removed to allow a hydraulic tool jig to be applied to compress the spring further, so as to ease the unscrewing of a second nut holding pressure on the spring. When the spring was compressed past the specified range, the risk of failure of the rod may have increased due to the increased stresses, especially if an undetected fatigue crack already existed at the failure point.
- The manufacturer's user manual highlights the importance of the rod guard, but does not cover this in the procedure for jaw discharge opening adjustment. The manufacturer has already issued an alert to their clients, intends to improve the contents of the user manual/training material, and investigate design improvements to reduce the likelihood of fatigue related failures.
- Investigations are continuing to establish all contributory factors to the failure.

Recommendations:

Never remove guards that prevent uncontrolled ejection of components containing stored energy, unless the energy is released or adequately contained.

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