SAFETY ALERT

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HSE Information bulletin – Skid-steer loader

Background

On Thursday 12th June, 2008, an employee of SITA UK Ltd was killed whilst operating a JCB 'Robot' 170 skid-steer loader. Following further investigations, the HSE have recently released the following information bulletin.

Skid-steer loader safety alert

The purpose of this information bulletin is to alert employers and employees about a fatality where an operator was crushed by the lift arm of a skid-steer loader. The bulletin describes the dangers that can result from defective interlocks which, when combined with unsafe operating practices, can potentially result in serious injury or death to the operator and/or others in the vicinity of the machines. The bulletin stresses the importance of reviewing and following manufacturer's instructions, and having properly trained operators as well as the need to test, inspect and maintain interlocks.

The arms and bucket tilt mechanism on skid-steer loaders present potential crushing and shearing hazards when they are moving. Cab fronts are not necessarily enclosed and often entry/exit is via the cab front. Hence, operators can potentially be exposed to these hazards if they lean out of the cab front or, as they exit the cab on front exit/entry machines. People who approach the machine whilst it is operating or perform maintenance are also at risk from the crushing hazards.

One of the safeguards that skid-steer manufacturers install, to help reduce the risk of crushing, is an interlock to prevent unexpected or inadvertent operation of the arms and tilt mechanism. This is normally achieved by the operator raising some form of restraint bar or arm rest which is linked to the machines hydraulic circuit.

The skid-steer loader in question was fitted with foot pedal controls directly linked to a hydraulic valve. The spool inside this valve should have been locked by an electrical solenoid activated by raising the restraint bar. During an investigation by HSE it was found that raising the restraining bar failed to engage the spool lock leaving the pedals active, ie the operator could still operate the lifting arm and tilt mechanism using the pedals even though the restraint bar had been raised. This only occurred if the foot pedals had not quite returned to their neutral position before the restraint bar was raised. When not in neutral, it was found that the solenoid could not engage with the valve's spool.

Two potential causes were identified that would prevent the pedals returning to neutral, as follows:

- Even on an adequately maintained machine, the operator may inadvertently rest their foot on the pedal (foreseeable given the relatively restricted space) thereby holding it off neutral.
- Poor maintenance or a build up of material can increase resistance on moving components of the pedal linkages. This resistance overcomes the spring force needed to return the pedals to neutral.

When using any skid-steer loader it is essential that operators are properly trained and that they operate the loader safely in accordance with the manufacturer's operating manual. However, if a skid-steer loader is identified as having this particular type of interlock (ie direct link to a hydraulic valve), operators also need to be made aware of the potential for it to fail to engage and reminded that they must:

1. Always lower the bucket or attachment so that it is flat on the ground before they (or anyone else) approach the danger zone created by the arms and bucket tilt mechanism.
2. Always ensure that not only is the safety bar raised but that the pedal interlock has actually engaged before anybody approaches the danger zone, ie ensure that the pedals are not still active.
3. Daily check the function of the interlock. This will require the operator to:
    - raise the lift arms then partially lower them;
    - release the pedals completely;
    - raise the safety restraint bar;
    - attempt to lower the lift arms keeping the restraint bar raised.

If these pedals are found to be active with the restraint bar raised it is likely that the pedals are not returning to neutral. This is a potentially dangerous fault and the machine must be taken out of service until the fault is rectified.

Those with responsibility for maintenance of skid-steer loaders should identify whether the machine if fitted with this type of direct linked interlock. The maintenance regime must include checking/maintaining the interlock mechanisms. In particular;

- Ensure that the areas around the pedals, pedal linkage, valve block and spool valve are clean
- Ensure that the pedal bearings and pedal shaft are lubricated and check for smooth operation.

Maintenance personnel also need to be made aware of the potential for this interlock to fail to danger and should be reminded that they must exercise greater care when undertaking maintenance which should be done in accordance with the manufacturer’s recommendations.