

Technical Note No 4

Safety and Maintenance of Captive-Bolt Equipment

Summary

All captive-bolt instruments are potentially lethal. It is essential that the safety and operating procedures recommended by the manufacturer are precisely followed, and that all operators of captive-bolt equipment are properly trained in its safe operation and maintenance.

Correct cleaning and maintenance of captive-bolt equipment is essential to ensure that all animals are effectively stunned.

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Safe operation

It is **essential** that the safety procedures recommended by the manufacturer are closely followed, and that all operators of mechanical stunning equipment are properly trained in its safe operation and maintenance. Equipment must be regularly checked by a qualified engineer and the following procedures should be followed:

- when handling captive-bolt equipment, during and on completion of loading, the muzzle of the stunner must at all times be pointed away from any part of the operator's, or any other person's, body
- refer to manufacturer's instruction sheet for the correct loading procedure and correct cartridge. Avoid repeated use of too heavy a cartridge, or air shots, which can result in the bolt shearing and flying free of the stunner
- captive-bolt stunners should always be handled as if they are loaded
- once the stunner has been loaded, ensure that the mechanism is in the 'safe' position until an animal is ready to be stunned
- never leave a loaded stunner unattended
- in the event of a misfire, do not open the stunner breech for 30 seconds. Sometimes slow primer ignition will cause a 'hang fire' and the cartridge will explode after a short pause
- at the end of the day's kill, return the stunner to the person appointed to carry out the daily cleaning procedure
- make certain that the stunner is unloaded before cleaning
- immediately report any faults in the operation of the stunner to the person responsible for maintenance and do not use the equipment until the fault has been rectified
- ensure that the captive-bolt equipment, when not in use, is stored securely at all times

Routine maintenance

The ability of captive-bolt equipment to deliver an effective stun is mainly dependent on the velocity of the bolt. Lack of regular maintenance can significantly reduce bolt velocity and the efficiency of stunning.

Increased friction caused by a build-up of carbon deposits and/or defects in the firing chamber are the main conditions which lead to reduced bolt velocity. A build-up of carbon deposits in the breech of a stunner can reduce the velocity of its bolt by up to 50 per cent. If the bolt cannot retract fully into the breech, the explosive pressure exerted on the piston will be reduced, due to the increased size of the expansion chamber. This can also occur if any of the recuperator sleeves are worn. Similarly, if there is excessive wear on the piston, cylinder or flange, gases will escape around the piston and the propulsive force will be reduced. Corrosion, or build-up of carbon, can also cause increased friction around the cylinder, bolt and undercut.

The biggest single cause of power loss is the failure of the bolt to return fully into the breech after the shot. Where recuperator sleeves are fitted, care must be taken to ensure that, when the muzzle is screwed into position, it causes the sleeves to be compressed.

If this does not occur, either insufficient washers or sleeves have been fitted, or some sleeves are worn and must be replaced.

Captive-bolt stunners should be dismantled, cleaned and lubricated after use, even if they are employed only a few times a day, or even less frequently. Back-up equipment must also be regularly serviced, even if it has not been used. The continual use of the captive-bolt, as occurs on a busy line in a slaughterhouse, causes comparatively less build-up of carbon than sporadic use for a similar number of shots. Daily maintenance must include:

- dismantling of the stunner
- visual examination for evidence of damage and signs of excessive wear
- removal of blood and water
- removal of carbon deposits from the breech and undercut
- checks on the condition of recuperator sleeves
- re ordering of recuperator sleeves on the bolt assembly
- general lubrication

Daily removal and cleaning of the bolt assembly reduces the chance of excessive wear on any one part of it, ensuring continued, efficient operation.

IMPORTANT:

The manufacturer's instructions should be followed at all times.

DISCLAIMER OF LIABILITY

In no circumstances can the HSA accept liability for the way in which the equipment in this leaflet is used: or for any loss, damage, death or injury caused thereby, since this depends on circumstance wholly outside the HSA's control

For enquires about practical training in the correct use and maintenance of captive-bolt equipment, please contact the HSA at the address overleaf.

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Further reading

HSA Guidance Notes No.2: Captive-Bolt Stunning of Livestock (5th Edition)
Humane Slaughter Association 2014